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Contents

NOTES AND COMMENTS: German Dye Trust Dividend; Further I.C.I. Rationalisation; The New "Physical Society"; A Suggestion from Professor Bone; Advertising Pays 389
Chemical Engineering Group: Meeting and Dinner 391
Removal of Dust from Flue Gases 393
Letters to the Editor 394
Gas Analysis by the Thermal Conductivity Method 395
The British Association Programme 397
Additional Duties on Chemical Products 398
Recent Advances in Metal Protection 399
Decay in Structural Stonework 400
Developments in Modern Laboratory Equipment 401
Society of Glass Technology 404
News from the Allied Industries 405
Mr. H. J. Pooley's Tragic Bereavement 405
Improvements in Non-Corrodible Steels 406
Chemical Industry Lawn Tennis Tournament 406
From Week to Week 407
Weekly Prices and Market Reports 408
Patent Literature 410
Points from Manufacturers' Literature 412
Commercial Intelligence and Company News 414

Notes and Comments

German Dye Trust Dividend

FOLLOWING upon the announcement that the final ordinary dividend of Imperial Chemical Industries was to be 3 per cent., making with the interim dividend, paid in December, a total of 4½ per cent. for the year there was guesswork in financial circles regarding the amount of the dividend to be announced by the I.G. Farbenindustrie. The decision of the company's board of directors at Frankfurt, on April 16, proposing the distribution of 7 per cent. as against 12 per cent. for the preceding year was better than anticipated, for on the day when the directors' meeting was in progress, there was still a feeling on the Stock Exchange that only 6 per cent. would be paid, in consequence of which the I.G. shares, which are better known as the German Dye Trust shares, dropped several points, and registered sharp fluctuations. Apart from the company's ordinary shares, which are still unissued and are destined for exchange transactions against those of other concerns, the German Dye Trust holdings now total Rm. 114,347,800 (approximately £5,717,000); as given in the report for 1930 they amounted to Rm. 85,630,000 (approximately £4,281,000). In view of the possibilities offered under the legal provisions of the third German Emergency Decree of October 6, 1931, regarding a facilitated reduction in the share capital of German companies, a proposal involving the cancellation of Rm. 110,000,000 (£5,500,000), effected as from December 31, 1931, is to be submitted to the general meeting of shareholders on May 10. This will reduce the ordinary share capital, now entitled to dividend to £34,250,000.

The company's gross profits have fallen from Rm. 217,480,000 (£10,874,000) last year to Rm. 155,310,000 (£7,765,000) or by 30 per cent. Net profits are almost halved, having declined from Rm. 95160,000 (£4,758,000) in 1930 to Rm. 51,460,000 (£2,573,000), including the carry-forward, out of which, as already reported, 7 per cent. (against 12 per cent. for the preceding year) is to be distributed on the Ordinary share capital entitled to dividend. On the assets side of the balance-sheet the company's plant and equipment is entered at Rm. 456,500,000 (£22,825,000) against Rm. 494,190,000 (£24,709,000) in the previous year. As regards the developments in the company's business, it is reported that sales of dyestuffs and auxiliary products have remained stable, a decline in the European markets having been compensated by an improvement in oversea trade.

Further I.C.I. Rationalisation

FINALITY has not yet been reached in the organisation of Imperial Chemical Industries. There remain further perfections to be attained in the sphere of both physical and financial organisation. These are being secured by strict adherence to the principle that "if we are to maintain our position in the manufacturing world we must adopt every new process, every fresh device, every improved method which the advance of knowledge dictates." That phrase, which Sir Harry McGowan used in his speech as chairman at the recent annual meeting of the shareholders, constituted a fitting introduction to his observations upon large scale business in general and that of I.C.I in particular. For rationalisation to be real and effective, the closing down of plant must not merely concentrate manufacture, but increase earning power. Old equipment must be written off as methods improve. Strength must characterise the financial structure as much as the physical. The doubling of

the allowance to central obsolescence fund, for general and not specific reasons, the cautious basis upon which profit is struck, the writing down of interests in subsidiaries, the retention of a powerful reserve position with general reserve amply covering investment depreciation, and a strong fund of ready cash, reinforced by strict working economy and rigid control over capital expenditure, are some of the evidence for sound finance cited by Sir Harry McGowan.

The number of individual subsidiary companies will ultimately be reduced and their assets and business will be transferred to other undertakings in the group. Sir Harry was wise in making it clear that the coming liquidation of certain of these companies will be attributable to progress, and not to failure. This explanation is desirable, because the liquidation of a company may give rise to misapprehension. Only too often companies are put into liquidation because they are failures, because of continuous losses and exhausted resources. People are apt to think that the liquidation of an I.C.I. company is due to the same cause. This is not so. Liquidation in the case of any of the subsidiary companies represents not a tale of disaster, but a step in the work of financial rationalisation.

The New "Physical Society"

ARRANGEMENTS are proceeding for an amalgamation between the Physical Society of London and the Optical Society, which have worked in close harmony for some years past. It is proposed to give the amalgamated body the title of "The Physical Society," omitting that reference to London which world-wide membership has rendered an anachronism. The Physical Society is the older of these two societies, having been founded in 1874, whereas the Optical Society came into existence in 1899, possessing similar aims and methods but with a more restricted field of operation. About one half of the members of the councils of these two societies are identical, joint meetings are frequent and both bodies share the same headquarters. Once every year they act jointly as organisers of an exhibition of scientific instruments and apparatus, when the latest developments are brought before the instrument-using public. It is therefore fitting that they should amalgamate, for in doing so it is possible that they will greatly assist their present aims, which are so much alike and yet so individualistic. Already this is evident from the announcement that one meeting each year will be held if possible in the provinces.

A Suggestion from Professor Bone

A SUGGESTION that the salvation of the iron and steel trade might be found in State assistance taking the form of guaranteed debentures for the erection of modern plant, instead of by the imposition of tariffs, has been put forward by Professor W. A. Bone in a recent issue of the *Journal of the Society of Chemical Industry*. Professor Bone, it will be recalled, is a former chairman of the Federation of British Industries, so that, irrespective of other considerations, there may be something in his views. With this financial support, he advocates the erection and equipment in selected localities of three or four modern plants, each of a capacity of 10,000 tons of steel per week, complete with coke ovens, blast furnaces, steel works and rolling mills, all co-ordinated so as to ensure the greatest possible fuel economy, upon the subject of which he is, of course, a recognised authority. This scheme, he states, would eventually be a far more effective help than any tariff protection, for the erection of the plant would, in the first place, give immediate employment to thousands of men who are now idle.

Advertising Pays

THE Advertising Association's Research Department has for some time been engaged on investigating the balance sheets and profit and loss accounts of the leading businesses in this country with a view to discovering how far success and advertising go together. The figures of 1,664 large companies, whose reports were issued during the twelve months ended April 15, 1932, have been examined. Many of these companies do, and all of them could, apply advertising as a selling force in the marketing of their products. Of these 1,664 companies it is revealed that 313 increased their profits. A further 139 show a decline of less than 10 per cent. on the previous year's profits. It is common knowledge that prices fell considerably during the past year, and a concern which shows a decline of only 10 per cent. in profits would certainly have had at least to maintain the volume of its turnover and the number of its customers. Adding together the 313 companies which increased their profits and the 139 which show only a slight decline we have a total of 452.

Of this total of 452 no less than 311, or almost 70 per cent., are concerns which advertise. This seems to be a clear indication that businesses which have the courage to keep up or increase their advertising in times of depression stand more than twice as good a chance of keeping up or increasing their profits as those which do not. These companies were not specially chosen nor were they taken at random, but are fully representative of all kinds of British industry.

Books Received

ECONOMIC CONDITIONS IN ETHIOPIA (ABYSSINIA), 1929-31. Report by Lieutenant-Colonel G. Mackereth. London: H.M. Stationery Office. Pp. 30. 1s.

PHYSICS IN SOUND RECORDING. By A. Whitaker. London: The Institute of Physics. Pp. 24. 1s. 2d.

The Calendar

May 2.—Royal Society of Arts. "Recent Researches on the Nature and Function of Vitamins." J. C. Drummond. 8 p.m. John Street, Adelphi, London.

May 2 to 5.—Ceramic Society. Clay Convention and Spring Meetings of the Refractory Materials and Building Materials Sections. Folkestone.

May 2.—Royal Institution. Annual Meeting, 5 p.m. 21 Albemarle Street, London.

May 2.—Society of Chemical Industry. London Section. Annual Meeting. General Discussion on "Smoke Abatement in Industry," opened by E. C. Evans, followed by H. Clifford Armstrong, R. J. Sarjant, Dr. J. S. Owens, Dr. E. W. Smith and Dr. R. Lessing. 8 p.m. Burlington House, London.

May 3.—Institution of Civil Engineers. "Some Aspects of the Corrosion Problem." Ulick R. Evans. 6 p.m. Great George Street, London.

May 5.—Chemical Society. Ordinary scientific meeting. 8 p.m. Burlington House, London.

May 5 and 6.—Iron and Steel Institute. Annual Meeting. 10 a.m. Institution of Civil Engineers, Great George Street, Westminster.

Chemical Engineering Group: Annual Meeting and Dinner

Sir Robert Horne on Currency and Prices

THE annual general meeting and dinner of the Chemical Engineering Group of the Society of Chemical Industry was held at the Waldorf Hotel, London, on Friday, April 22, Mr. George Gray, chairman of the Group, presiding.

The CHAIRMAN, in opening the meeting, referred to the great loss that the Group and the Institution of Chemical Engineers had sustained during the year by the death of the first chairman of the Group, Professor J. W. Hinchley.

The report of the General Committee stated that the success of the Group during the past year had been remarkable, even in face of the high standard which had been set by previous sessions and, probably as the result of such energetic activity, the Group was weathering the economic storm in a far better manner than many other institutions of a similar kind. There had been a slight fall in the membership, the first for ten years, but it was nothing to worry about, although members were urged to assist the committee in bringing the membership back to its former figure. The Group had continued its policy of co-operation with local sections of the Society and other scientific bodies and had also taken a prominent part in the celebration of the jubilee of the Society of Chemical Industry, which took place in London last year. In September last Mr. W. F. Darke, hon. secretary, resigned his office and the committee placed on record its deep appreciation of the admirable manner in which Mr. Darke had carried on the work of the Group. At the same time the committee expressed its appreciation of the work done by Mr. Darke's successor, Mr. Donald McDonald, and of the services of Mr. C. J. T. Mackie, assistant secretary, and his staff.

Mr. J. Arthur Reavell, who was elected Chairman of the Chemical Engineering Group at the thirteenth Annual Meeting on April 22.

The accounts, which were presented by Mr. F. A. Greene, showed a slight excess of expenditure over income, but generaly the position was considered satisfactory and the accounts, together with the report, were unanimously adopted.

The CHAIRMAN announced the election of Mr. J. Arthur Reavell as chairman for the ensuing year and the re-election of Mr. Donald McDonald as hon. secretary, and Mr. F. A. Greene as hon. treasurer. The election was also announced of the following members of the committee: Major L. J. Barley, Major H. J. W. Bliss, Mr. George Gray and Mr. W. Russell.

The CHAIRMAN, in announcing these elections, expressed the regret of the committee that nominations had not been sent in from the general body of the members and expressed the hope that, with the object of introducing as much new blood as possible to the general committee, the members would in future years send in other nominations than those made by the committee itself.

Dr. W. R. ORMANDY proposed a hearty vote of thanks to Mr. Gray for his services as chairman during the past two years.

The Annual Dinner

The annual dinner followed, the principal guest being the Right Hon. Sir Robert Horne, G.B.E., M.P. The others present included Viscount Leverhulme, president of the Institution of Chemical Engineers; Mr. E. A. Alliott, Dr. E. F. Armstrong, Dr. S. G. Barker, Dr. H. J. Bush, Mr. W. A. S. Calder, Major H. J. W. Bliss, Mr. A. J. Broughall, Dr. R. T. Colgate, Mr. H. W. Cremer, Dr. W. Cullen, Mr. W. F. Darke, Mr. G. Keville Davis, Sir Henry Fowler, Mr. C. S. Garland, Mr. C. J. Goodwin, Mr. F. A. Greene, Eng.-Rear-Admiral J. Hope Harrison, Dr. W. H. Hatfield, Mr. Donald McDonald, Mr. W. Macnab, Professor G. T. Morgan, president of the Society of Chemical Industry; Sir Frederic Nathan, Dr. W. R. Ormandy, Mr. P. Parrish, Mr. H. J. Pooley, general secretary of the Society of Chemical Industry; Mr. J. Davidson Pratt, general manager of the Association of British Chemical Manufacturers; Mr. J. Arthur Reavell, Mr. B. Seebohm Rowntree, Mr. L. H. Sensicle, Mr. H. Talbot, Professor M. W. Travers, and Dr. A. J. V. Underwood. The chair was again taken by Mr. George Gray.

Sir ROBERT HORNE gave an address on "Currency and Prices." Nature, he said, had never been more bountiful than it was at the present time and science had never been more active or more inventive than it had been in recent years, and the result was that the world's production of all commodities had been greater than mankind had almost been able previously to conceive, yet in a situation of that kind, we were in the midst of a period of depression such as had never been known since the dark ages. It was a problem which was almost paralysing in its intricacy and one which stupified by the very fact that what seemed a condition in which everybody should be well off had resulted in a condition of great hardship, distress and misery throughout the whole habitable globe. What was the reason for this condition of things? It was that the medium of exchange had broken down and not that over-production had brought about the present state of affairs. The trouble the world had got into was because gold which had been the standard of exchange for a long time in international trade had diminished to an extent which had hampered those exchanges which should ordinarily have taken place. The position had arisen to a considerable extent, though not entirely, by the sterilisation of gold in France and America. The payments which had been made to those creditor countries by way of reparations and international debts arising out of the war had resulted in gold steadily flowing into those countries and it was not being used as the gold standard, properly operated, required. He did not hesitate to say that if that gold had been in this country, it would, with our long traditions, have been used as a means of exchange and as a basis for credit, and the present situation throughout the world would never have arisen.

Restricted Gold Circulation

The result of the action of France and America had been to restrict the amount of gold in circulation to a figure which was entirely inadequate for the purpose of carrying on commerce and trade so that there had been an immense depreciation in its value in relation to commodities, and therefore, a fall in prices which had brought disaster upon us. The result throughout the world had been quite catastrophic. Prices in terms of gold had become quite inadequate to meet the cost of production which included many fixed charges which had to be paid at the rate originally fixed, notwithstanding the value of the pound. Yet, clearly the prices obtained for products in the market were the only source from which these costs of production and other charges could be met and if these remained stable, or indeed showed a tendency to increase, as many of them did, whilst at the same time prices fell, it was obvious that there must be a complete breakdown in the whole financial system of the world. Whilst the national expenditure now was considerably higher than it was in 1924, the prices out of which we had to meet this expenditure were 40 per cent. less, and as a result of this fall in prices the burden of debt which had been placed upon our shoulders in this country arising out of the war had been practically doubled as compared with the position at the time the money was borrowed. In other words, there was a difference of £7,000,0000 or £8,000,000 in the debt now to be borne

as compared with the time when that debt was contracted, and unless we could get prices up, which was the only alternative to getting costs down—and this latter seemed almost impossible in many cases—the position looked hopeless.

The Only Way Out

The only way in which the present impasse could be overcome was by international action, and he looked to the conferences at Lausanne and Ottawa this year to find a method for co-operation among nations to deal with reparations and war debt problems. If France had, last year, readily accepted the Hoover moratorium, it would have had an enormous psychological effect upon the problem of reparations, but that plan had failed because it did not receive that unanimous acquiescence and hearty reception which it ought to have obtained. Every effort must be made to ensure a return of confidence in both France and America, but that would not be obtained by a complete cancellation of war debts, because it was impossible to expect France to agree to that, but it should be possible to devise a compromise and he believed that if there was a moratorium for five years, and that at the end of that period Germany should pay a stipulated sum—much smaller than her present obligations—it would be possible to get the consent both of France and Germany. Then it would be possible to approach America which at present insisted upon the observations of all international compacts, but he did not believe that if Europe came to a conclusion of this nature America would be less generous to Europe than the nations of Europe would be to each other. Such an agreement would, he believed, be a prelude to a further agreement on the method by which the operation of international exchange was to be carried on in the future. If we in this country could not be sure that the gold standard was going to work better than it had been operated during the past few years, then we should not be willing to return to it, but if once we could get international agreement upon this great question, the next step would not be so difficult.

Great Britain's Improved Position

Great Britain was certainly now in a better position than any other country in the world, for the change that had taken place during the last six months was nothing short of a marvel and the solid character of the British people had produced an enormous influence upon the rest of the world. That influence could be exercised with far greater benefit now than appeared conceivable a few months ago and curiously enough the improvement in our position had been brought about by the fact that we were no longer on the gold standard. That, however, did not form a fundamental objection to being on the gold standard, but we now had a power of manœuvre we had not possessed for many years which gave us a great advantage. The endeavour now should be so to operate sterling as to suit the great area of which this country was the centre, and one of the things which seemed to him of vast importance was that we should not allow sterling to rise so high that these other people could not live with us at that level. The higher sterling rose the more difficult it became for other countries to pay, and therefore we should keep sterling at such a level that other countries could march with us. For instance, when the pound rose in value the other day, it made it very difficult for Sweden and Denmark. Therefore, he urged that every step should be taken to keep sterling at a point more nearly suited to the operation of the whole of the sterling area of the world, because that would also make it easier for us to conduct our business. Keeping sterling at a level which made business easy throughout the world would prevent that enormous speculation which went on when we returned to the gold standard in 1925. This provided the easiest speculation that was ever offered to humanity because the whole world put money into sterling and it came into London in floods at $3.20 and was taken out, when we returned to the gold standard at $4.86.

Keeping Sterling Steady

He hoped we had learned enough not to submit ourselves to that kind of operation again but it would occur if we allowed sterling to go up. His own belief, so far as he could form a computation, was that some figure about $3.45 was the kind of value at which our sterling ought to stand, although he did not put that suggestion forward at all dogmatically. In all this we must not lose sight of the ultimate objective to bring the whole world back to some method of international exchange by which the operations of commerce would be allowed to flow with the greatest possible freedom. He regarded the fact that we were now a protectionist country as giving us an opportunity of doing something to bring down tariffs and take some of the shackles off the commerce of the world. The present system in which every country was condemned to live for itself would bring the whole world to bankruptcy sooner or later and that was why he looked forward to the great Conference at Ottawa which he hoped would teach lessons to everybody and would establish the power and influence of the British Empire to the greatest possible extent in order that we might work the greatest possible good. This must be the first objective, but in the end what we must do was to use that influence so acquired for the benefit of the whole of civilisation which depended to-day more than anything else upon the leadership and guidance which this country could give the world.

On the motion of the chairman, a cordial vote of thanks was passed to Sir Robert Horne for his address.

Sir HENRY FOWLER, president of the Institute of Metals, proposed "The Society of Chemical Industry."

The Origin of the Chemical Engineering Group

Professor G. T. MORGAN, president of the Society of Chemical Industry, responding to the toast, made special reference to the formation of the Chemical Engineering Group in 1918 which, he said, was the beginning of a great success in two respects. First of all it brought into being an active Chemical Engineering Group which had gone on flourishing and now had a membership of nearly 500 and was regarded as one of the most valuable branches of the Society. The Group had also remained a loyal member of the mother Society. The other aspect was the relation of the formation of the Group to the large number of kindred institutions which continued to multiply. In this respect, said Professor Morgan, he knew Sir Henry Fowler would not misunderstand him when he said that the chemist rather regarded the engineer as a horrible example. Whenever engineers performed a new function for the benefit of humanity, they celebrated the event by forming themselves into a new association. He believed that Sir Henry Fowler had already been president of four institutions and there were 100 or more of them, so that Sir Henry still had many worlds to conquer. Personally, however, he held the view that there were far too many kindred societies, although he recognised the difficulty in approaching the problem of reducing the number. He believed it would be done ultimately although he himself might not live to see it.

Indeed, it might take so long that even some of the younger members of the Society would not live to see it, but the Chemical Engineering Group was an interesting example of what might be done. The Society of Chemical Industry had existed for 50 years and had developed local sections throughout the country, and in America, Canada and Australia, whilst in more recent years the number of Groups had been developed. There was the Chemical Engineering Group and only a short time ago there had been inaugurated under the happiest auspices a Food Group which he believed would have great success. There was also the Fuel Committee. In addition one or two other Groups were in process of formation but as the negotiations were still going on he would say nothing of the details. Nevertheless, it was to be hoped that this principle of local sections and groups would be expanded to embrace all the subjects in which chemists and chemical engineers were interested. The Chemical Engineering Group had set a fine example, because it regarded itself as so much a part of the Society of Chemical Industry that at its annual dinner it had not even put down the toast of itself, an action which he regarded as a very fine gesture. For that reason, however, he proposed to break the rules and to propose the "Chemical Engineering Group."

Mr. J. ARTHUR REAVELL proposed "Our Guests," which was replied to by Viscount Leverhulme.

The final toast of the evening, "The Chairman," was proposed by Mr. H. Talbot.

THE important Japanese producer of soya bean casein, the Nishin Seyu Co., has discontinued manufacture because of high production cost and low quality of the casein.

Removal of Dust from Flue Gases

The Problem Exemplified by Modern Power Station Practice

Methods for the removal of dust from power station flue gases were reviewed by Mr. J. Meyer at a meeting of the North-Western Section of the Institute of Fuel, held at Manchester on Friday, April 22, when Mr. E. Watson Smythe presided. Extracts from the paper are given below.

THE dust associated with the gases discharged from power plant chimneys is composed partly of mineral matter which is derived from the non-combustible matter in the coal, and partly small particles of coal or coke resulting from the non-completion of combustion. The amount of dust present in the gases will vary with the type of firing and class of coal; the proportion that the combustible matter in the dust bears to the non-combustible will also vary with the same factors. An analysis of a number of installation shows that with stoker firing up to 65 per cent. of the dust is deposited in the combustion chamber, boiler, etc., the dust discharged containing 15 to 35 per cent. of carbon. With pulverised fuel firing up to 30 per cent. of the dust is similarly deposited and the dust discharged contains 5 to 15 per cent. of carbon.

An efficient collector should be capable of dealing with a wide range of dust concentrations in order to cover a wide range of boiler operations including soot blowing; it should have a rising efficiency with loading; it should be capable of handling diverse sized dusts with equal efficiency; and it should necessitate a minimum use of power, either for direct operation or expressed as increased auxiliary consumption due to draught loss. Although a single type of collector has yet to be developed which combines all these features it is possible to select types acting in conjunction which will produce a satisfactory practical solution.

The efficiency of dustcatchers may be measured either by sampling dust-laden gases before and after the collector or by measurement of collection over a long period. In the first method two sampling tubes are employed, one before and one after the collector. Each is connected to a fan discharging into a bag filter, collection being started and stopped simultaneously by shut-off valves, whilst the velocity in the sampling tubes should be adjusted continuously to that in the main flue at the point at which samples are taken. The objections to this method of testing are the difficulty of measuring by Pitot tubes in a dust-laden atmosphere and the difficulty of ensuring that the samples are fully representative. The second method, by actually measuring the dust discharged by the collectors and making an accurate computation of the weight of dust offered to the collectors, presents a greater opportunity for accurate measurement.

Pre-Treatment of Coal

In regard to the pre-treatment of coal, so far as prevention is regarded as better than a remedy, then coal cleaning must be looked upon as the most satisfactory method of dealing with the problem and as the ultimate solution to be aimed at. It is a subject, however, which must occupy the attention of the chemical engineer rather than the power station engineer. Regarding settlement, in power station practice a fairly average figure for the velocity of gases in the discharge ducts was 40 ft. per sec., at a temperature of 300 deg. F. Under these conditions only particles of a size of approximately greater than 20 I.M.M. mesh would separate out by gravity. Gravity separation could only be carried out by the reduction of the velocity of the flue gases to a figure of approximately 4 ft. per sec. and the provision of a long travel for the gases up to 300 ft. or more. Even under these conditions particles of a less diameter than 200 mesh did not settle out. This method was therefore impracticable as far as power station work was concerned.

In power station practice the use of bag filters has been confined usually to the collection of ventage from pulverised fuel systems. This type of filter is usually designed for low velocity and it was necessary to arrange for the bags to be cleared periodically. This was done either by an automatic shaking or rapping mechanism, or by the use of a scavenging fan. The chief factors militating against the use of this type of apparatus on a large scale were the pressure loss and the ability of the material employed in the construction of the bags to withstand the temperature and acid content of the gases.

Collectors operating on the principle of centrifugal force are generally of the stationary type, the gas being given a rotary motion by tangential admission to a volute or by the use of guide vanes. Other conditions being equal the efficiency of this type of collector is directly proportional to particle size and hence this type of collector is more suited to heavy dusts. In the case of two collectors operating on the same dust the efficiency varies as the square of the tangential velocity and inversely as the radius. Model collectors would, therefore, show a higher efficiency than a full-sized apparatus operating on the same dust. Due to increasing velocity with load this type of collector shows a rising efficiency, but this is only obtained at the expense of greatly increased draught loss.

Washing Systems

In this country two types of washing systems have been developed and applied to large-scale power station work. In the first system wetted baffles only are used, arranged vertically in staggered rows. These baffles are of hollow construction, octagonal in exterior section, each face being alternatively concave and convex. Water from a top supply tank feeds the hollow baffles, allowing an overflow to trickle down over all the faces of the baffles. The bases of the baffles are immersed in water so that the gases cannot short-circuit the water films. By the sinuous movement imposed on the gas stream by the staggering of the baffles, the maximum surface of the gas is exposed to the action of the water film. The efficiency of this apparatus is dependent primarily on the number of rows of baffles employed. Six rows of baffles are generally employed, the quantity of water used varies from two to three gallons per 1,000 cub. ft. of gas. The draught loss is not excessive, being of the order of 1 in. water gauge.

The second method has been developed on the principle of two-stage washing The gases on entering the washing chamber are passed through primary sprays which are of a type designed to atomise the water and to produce a condition of mist at the entrance to the washing chamber. The gases passing through this mist absorb water vapour and are rapidly cooled down to dew point when the evaporated water is recondensed and produces a primary deposition of dust particles. The secondary sprays are formed by high pressure jets of water impinging on flat plates placed at a distance of about 6 in. from the jets. These set up a curtain of water which washes down the wetted dust, and, to take care of any carrying over, the gases are finally passed through a number of rows of staggered V-shaped baffles, the faces of which are continuously washed down by a supply of water from an overhead tank.

In the construction of these washing systems cast iron is employed, wherever possible as a precaution against acid attack. Various methods have been tried for the protection of steel ducting, including lead lining, concrete lining and protective paints, but operating experience has not been sufficiently extensive to indicate special advantages of any one method.

Disposal of Dust

With dry collection systems it is the usual practice to discharge the collected dust to the ash disposal plant. There are isolated cases where it has been found possible to dispose of the dust at a small price. With washing systems the disposal of the slurry presents more difficulty, as the recovery of the dust by settlement is not a satisfactory solution. It is possible, however, by the use of filter plant to remove the dust from the slurry and to discharge a clear effluent either to waste or to the washing system. The effluent leaves the washing chamber in the form of a thin slurry, the solid content being about 3 per cent., and passes to a thickener tank, where the solids settle automatically to the bottom on the tank while the clarified water overflows and is discharged The thickened slurry, now containing approximately 40 per cent. of solids is pumped to a filter operating on the rotary continuous vacuum principle which recovers the water in a perfectly clear condition.

Letters to the Editor

The Editor welcomes expressions of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE *unless its authorship is revealed to the Editor.*

The Water Gas Equilibrum

To the Editor of THE CHEMICAL AGE.

SIR,—I wish to comment upon the letter of J. R. Partington and W. G. Shilling published in THE CHEMICAL AGE for February 6, in which criticism is made of certain statements in my paper on the water gas equilibrium (*Ind. Eng. Chem.*, 23, 1019 (1931)-) regarding an earlier paper of theirs on the same subject (*Trans. Soc. Chem. Ind.*, 44, 149T, 242T (1925)-), and of my use of their specific heat equations in my own calculations.

Misled by the incorrect specific heat equations given on page 209 of Partington and Shilling's book (The Specific Heats of Gases, Benn, London (1924)-), I reached the conclusion that their calculations on the water gas equilibrium were in error, and that their specific heat equations were unable to correlate the experimental equilibrium values. I have now repeated my own equilibrium calculations using Partington and Shilling's corrected specific heat equations and note considerable improvement. Nevertheless, these equations do not reproduce the experimental data of the water gas equilibrium as closely as the specific heat equations of Lewis and Randall, of Eucken, and of Eastman. The results of these calculations will appear shortly in a letter to *Industrial and Engineering Chemistry*. It is felt that the experimental work on the water gas equilibrium has made an appreciable advance since Partington and Shilling's calculations appeared —particularly through the investigations of Neumann and Köhler (*Z. Elektrochem.*, 34, 218 (1928)-) and Emmett and Shultz (*J. Am. Chem. Soc.*, 51, 3240 (1929)-); ibid. 52, 1782, 4268 (1930)-)—and that their calculations are hardly representative of its present status.—Yours faithfully,

W. M. D. BRYANT.

Ammonia Department, E. I. du Pont de Nemours and Co., Wilmington, Delaware, U.S.A.

Sampling of Coal from Wagons

To the Editor of THE CHEMICAL AGE.

SIR,—Some little time ago a paper on "Errors in the Sampling of Coal from Wagons" was read by N. Simpkin, and gave rise to some misunderstanding. Mr. Simpkin set out to prove that the method given in the British Standard Specification for the Sampling of Small Coal does not give reliable results. To prove this he carried out experiments which show differences in ash content of the order of 3 per cent. In his tables one set of columns was labelled "B.E.S.A. increments" which the majority of people reading the paper would interpret as meaning the British Standard method. His explanation, given earlier on, which read as follows: "It must be clearly understood that in the subsequent tables, the columns marked 'B.E.S.A. Increments' refer to the fact that the increments themselves were taken by a specific method and do not imply that there was a certain number of such increments taken," was not expressed strongly enough to prevent readers being misled. The reference to "a certain number of increments" should have read "the number of increments specified by the British Standard Specification were not taken."

In this connection attention must be drawn to the heavily underlined paragraph in the Specification, which reads as follows: "It is essential that the sample should be taken by not less than the stated number of increments and that these increments should be evenly distributed over the consignment." Since, in the experiments tabulated in Simpkin's paper, the specified number of increments were not taken, these experiments cannot serve as a criticism of the method.

In the experiments recorded in later tables, it is interesting to note that when a greater number of increments is taken the difference in the two methods is not so pronounced, namely 8.1 as against 9.6 per cent. of ash. It is unfortunate that this is the only experiment from which conclusions can be drawn. In summing up, Mr. Simpkin says: "The only satisfactory method found so far is to sample the fuel by taking increments as the wagons are being filled or emptied." This conclusion precisely endorses the statement in the specification which Mr. Simpkins apparently has failed to notice, since he makes no reference to it in his paper. This reads as follows:—"It is recommended that whenever possible samples should be taken whilst the coal is in motion, although it is recognised that, in practice, this is not always possible." The experimental evidence presented by Mr. Simpkin, although of a somewhat limited nature and relating to dry slacks emphasises the importance of following this recommendation.

Finally, in the case to which Mr. Simpkin refers, namely that of the small consumer taking two or three wagons of dry slack, it would appear that this can only be sampled in motion as it would be impossible to obtain the necessary number of increments from the tops of the wagons, as laid down in the fundamental principle of sampling already enunciated, namely, that it is essential that samples should be taken by not less than the stated number of increments evenly distributed over the consignment.—Yours faithfully,

E. S. GRUMELL.

Chairman, on behalf of Committee responsible for the preparation of the Specification.

British Standards Institution, 28 Victoria Street, S.W.1.

Hydrogen Isotope of Mass 2

FOR a long time it has been considered that the nuclei of all hydrogen atoms are the simplest and that the nuclei of all other atoms are composed of hydrogen nuclei and electrons. It has now been found by H. C. Urey and G. M. Murphy, of Columbia University, in co-operation with F. G. Brickwedde, of the United States Bureau of Standards, that all hydrogen nuclei are not alike but that about one in every 4,000 is itself built up of two ordinary hydrogen nuclei, protons, and one electron. It has, therefore, twice the weight of ordinary hydrogen and is called an isotope of hydrogen because it has the same chemical properties. Its occurrence in ordinary hydrogen is so small that it had to be concentrated before its detection and identification could be made certain. Calculations were made of the vapour pressures of the two kinds of hydrogen which showed that it could be concentrated by the fractional distillation of liquid hydrogen at a low pressure only slightly above its freezing point. Samples were prepared in which the concentration was increased to 1 in 500 or 600. The isotope was detected and identified by means of its spectrum produced by passing an electrical discharge through the gas.

New Belgian Fertiliser Industry

THE Société Anonyme des Produits Chimiques de Tessenderloo, in co-operation with the French Potash group, the Société Commerciale des Potasses d'Alsace, commenced operations several months ago in a new plant at Quaedmechlen, Province of Limbourg. The equipment includes a contact acid plant with capacity of about 90 tons daily of 66° Bé sulphuric acid. A large portion of the acid production is employed in the manufacture of potassium sulphate for export trade. The production is approximately 35,000 tons annually, of which about 30,000 tons are exported. The company uses imported potassium chloride in the manufacture of the sulphate and also produces commercial potassium bisulphate. Another product of the company is a dibasic calcium phosphate made by the precipitation process with the use of hydrochloric acid and sold under the name "Fertiphos." It is described acid a white fine, homogeneous powder containing 38 to 42 per cent. of phosphoric acid and is being produced at the rate of 30,000 tons annually. The makers report that the material has become popular and it is planned to increase the production to 100,000 tons annually during 1933.

Gas Analysis by the Thermal Conductivity Method

Its General Principles and Application

The following article is based on information supplied by the Cambridge Instrument Co., Ltd., of London, which has made a detailed study of the thermal conductivity method of gas analysis and has devised special apparatus to meet the needs of those industries where gas analysis is essential for controlling purposes.

THERE are many industrial processes in which it is necessary to analyse mixtures of gases, and a number of instruments have been developed for this purpose. Many of these instruments depend for their action on the absorption of the constituent to be measured by some chemical substance, measurements of the volume of a sample of the gas under test being made before and after the absorption takes place, and corrections being applied for variations in pressure and temperature. Such instruments require skilful manipulation, and necessitate the withdrawal of a sample of gas which tends to disturb the conditions of the experiment, limit the speed of analysis, and renders it difficult or impossible to detect rapid changes in the composition of the gas. On the other hand, the thermal conductivity method of gas analysis by means of the katharometer devised and patented by Dr. G. A. Shakespear, has the advantage of being accurate, simple and quick, and has accordingly been widely used for some years in connection with the analysis of boiler flue gases. The unique features of the method render it equally suitable for other problems, and it is now being generally adopted in connection with a number of important industrial processes.

General Principles

The general principles of this method may be briefly explained by way of introduction. If a platinum wire, which is surrounded by a gas in a chamber, is connected to a source of constant electromotive force, the temperature of the wire will rise until a condition of equilibrium is reached, when the continuous dissipation of thermal energy is equal to the electrical energy supplied to the wire. The thermal energy is dissipated by conduction, by radiation and end cooling losses, and by convection. By suitably arranging the conditions, the loss of heat due to the two latter causes may be reduced to a negligible proportion of the whole so that the temperature attained by the wire when equilibrium is reached depends on the thermal conductivity of the surrounding gas. The temperature of the wire may be determined by measuring its

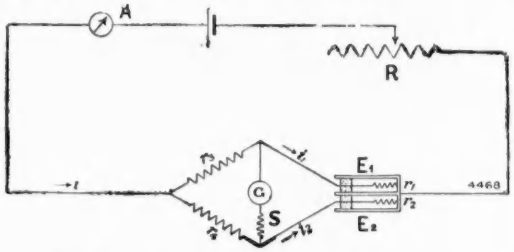


Fig. 1. The Thermo Conductivity Method explained by reference to the Wheatstone Bridge

electrical resistance, the electric current which heats the wire being used for this purpose. As the temperature of the wire varies with the temperature of its surroundings, even if the excess temperature remains constant, it is found convenient in practice to introduce a second wire for comparison purposes which is exposed to a standard gas, and to measure the difference in the resistance of the two wires when the condition of equilibrium is reached.

Fig. 1 shows a simple form of Wheatstone bridge which satisfies these conditions. The two identical spirals of platinum wire, having resistances r_1 and r_2 respectively, are enclosed in two separate cells E_1, E_2 in a metal block. Each of the spirals forms one arm of the bridge circuit, the other two arms r_3 and r_4 being of manganin. An electric current (which is adjusted by means of a rheostat R to a definite value i, as measured on the ammeter A) is allowed to flow through the bridge, thereby causing the two spirals to become heated and to lose heat to the walls of the cells. If the spirals r_1 and r_2, and the gases surrounding them, are identical in every way their temperatures will be equal. If, then, r_3 and r_4 are chosen to be equal, the bridge will be balanced and no current will flow through the galvanometer G. If the two cells contain gases of different thermal conductivities the spirals will cool at different rates, and one spiral will be maintained at a higher temperature than the other. The consequent difference in the resistance of the spirals will cause a deflection of the galvanometer G, the extent of which will depend on the difference in the conductivity of the two gases. The construction is such that changes in the temperature of the gases affect both sides of the bridge equally. If, therefore, the cell E_1 contains a standard gas, and the cell E_2 the gas to be tested, which is usually the standard gas mixed with another constituent, the galvanometer may be calibrated to show directly the percentage composition of the mixture.

The Differential Method

When it is desired to measure the difference in composition between two gases, each of which may be varying, or when complex mixtures of gases are involved, and it is desired to measure the percentage of one constituent (the other constituents differing in conductivity from one another and not remaining in a constant ratio amongst themselves) a differential method is employed. Two spirals are then used, one being exposed to the gas under test and the other one to a sample of the same gas from which the constituent to be measured has been removed or caused to take part in a reaction without affecting the remaining constituents. Alternatively, the first constituent may be caused to react in a determinate quantitative way with one or more of the other constituents, so that there is complete reaction of the first constituent. One spiral is then exposed to the original gas and the other to the gas containing the gaseous products of reaction. The method may also be applied if the first constituent can be caused to react with another gas addel in a suitable and constant ratio which does not affect the other constituents of the mixture except in a determinate way. One spiral is then exposed to the gas with the additional constituent added, and the other to the mixture of gases resulting from the reaction. When one of the constituents of a mixture is a vapour, compensation can be made by saturating the gas to be tested and the comparison gas with the vapour.

Advantages of the Thermal-Conductivity Method

The thermal conductivity method of gas analysis possesses a number of advantages. It is capable of accurately detecting minute changes in gas composition and the measurements are independent of the rate of flow of the gas. In addition to being applied to simple and complex mixtures of gases, the method may be applied to chemically inert gases and to gases which, though not inert, do not take part in any reaction which may be employed in a measuring device of the chemical type. Continuous direct readings are obtained which do not involve intermittent withdrawals of a sample of the gas and subsequent analysis of these samples. The gas mixture is not altered in composition during the measurement, and, when a measurement has to be made at a given point in an enclosure, there is little or no disturbance of the distribution of the gas. The apparatus has a low time lag. The time taken to reach a sensibly correct reading depends on the rate of molecular diffusion of the gas, on the magnitude of the change in gas composition which is to be measured, and on the accuracy with which this is to be determined. In a hydrogen-air mixture, in which the hydrogen content is rising steadily, the lag is about 13 seconds, while the meter will measure a given change in the hydrogen percentage to a new steady value with an accuracy of one per cent. in about 60 seconds, but this is by no means the limit which may be reached.

In the synthetic ammonia industry, the gas reactions which it is necessary to control vary considerably from one process

to another, and the method used to produce the hydrogen and nitrogen is to a great extent dependent on local conditions. It is, however, important to test that the hydrogen and nitrogen are pure, to control the mixture of three parts of hydrogen to one of nitrogen as it goes into the reaction chamber and to test the efficiency of the reaction by measuring the ammonia in the mixture of nitrogen, hydrogen and ammonia leaving the reaction chamber. In the cyanamide industry, on the other hand, it is desirable to measure the percentage of oxygen in the nitrogen before the gases pass over calcium carbide.

The Haber Process

In the Haber process, and in other processes developed on this principle, the mixture of hydrogen and nitrogen in the proportion of volume of 3 : 1 is highly compressed and heated to a temperature of about 500° C. in the presence of a suitable catalyst. The gases are then cooled and washed with water under pressure to dissolve out ammonia. Claude's modification of the process employs pressures of the order of 1,000 atmospheres, which give a higher " combination factor " and enable the ammonia to be removed by liquefaction at ordinary temperatures. If argon is present in the nitrogen, it tends to accumulate, and part of the gas has to be blown off to waste from time to time to prevent the partial pressure of argon becoming sufficiently great to affect adversely the

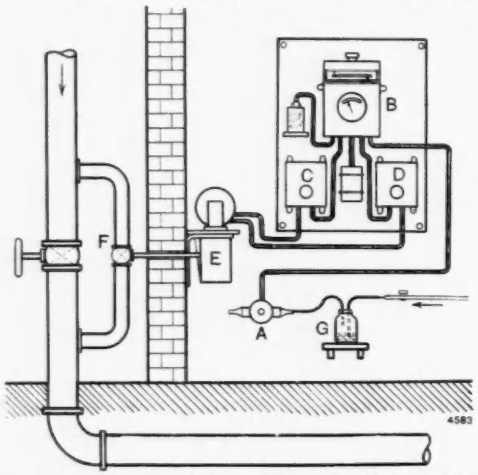


Fig. 2. Arrangement adopted for controlling the Hydrogen-Nitrogen Mixture in the Haber Fixation Process

chemical equilibrium in the reaction chamber. The usual method of analysing the gas mixture is to by-pass the gas over one cell of an unsymmetrical meter, with air as the comparison gas, and adjusted to be independent of small current and temperature variations at 75 per cent. hydrogen. Sometimes the apparatus is arranged to control the process automatically. Fig. 2 shows an outfit of this type. The hydrogen-nitrogen mixture from the compressor flows through a sampling pipe and a drying bottle G, and then passes over one cell of an unsymmetrical meter A, connected to an automatic regulator B. When the nitrogen content in the mixture exceeds or falls below the desired value, a device in the regulator energises through the relays C and D, motor-driven valve gear E, which operates the butterfly valve F in either a forward or a reversed direction.

Measurement of Sulphur Dioxide

The thermal conductivity method of gas analysis may be used to measure the percentage of sulphur dioxide in gaseous mixtures in connection with various chemical processes. It is being used, for example, to measure the percentage of SO_2 in the gases given off from pyrites burners in connection with the manufacture of sulphites and bisulphites. The gases from the burner pass through a cooler, and are then by-passed so that a sample flows past the meter, which is of the standard type. When the gases are dry, as is usually the case, no special precautions have to be taken against corrosion, but if there is a chance of moisture being present at any stage of the process the whole meter (with the exception of the platinum helix) is made of tin. There is usually a natural flow of gas which renders an aspirator unnecessary; if one is required, a lead-lined acid proof aspirator is supplied.

Fig. 3. Typical Single Point Thread Recorder

The rate of flow of gas over the meter is indicated on a bubbler, which is connected at the outlet of the system. Any traces of SO_3 in the mixture are removed before the gases reach the meter by passing them through a lead-lined filter. A typical single point thread-recorder is shown in Fig. 3.

The efficiency of the contact chambers in the contact process of manufacturing sulphuric acid may be checked by measuring the SO_2 content in the ingoing gases, and also in the gases which have passed the contact chamber and the SO_3 absorbers. Simultaneous measurements may be obtained using two meters, and the results traced side by side on the chart of a recording instrument; alternatively, a single measurement may be made of the difference between the two compositions (that is, of the percentage of SO_2 converted) by using a differential meter, one cell of which is exposed to the entering and the other to the effluent gases from the contact chamber. The outfit may be calibrated for a range of, say, 0-8 per cent. SO_2. Similar apparatus can be supplied for measuring the SO_2 content in the gases given off in roasting zinc concentrates or produced by calcining brimstone for the manufacture of sulphur dioxide or the corresponding aqueous solution, and in other applications where the gases only contain small traces of CO_2 and SO_3.

Measurement of Organic Vapours

Organic solvents, such as acetone, alcohol and benzol, are used in connection with a number of industrial processes, for example, in the manufacture of artificial silk, cordite or rubber-proofed fabrics, and in the dry cleaning industry. It is often desirable to control the concentration of the vapour so as to avoid risks of explosion or any undue loss of expensive solvent, and to ensure efficient working of the plant. The vapours may be readily measured by the thermal conductivity method using a standard meter, with dry air as the comparison gas.

The diagram Fig. 4 shows an arrangement adopted for measuring small percentages of acetone vapours in the air drawn from the spinning chambers prior to the solvent recovery process in connection with the manufacture of artificial silk. The vapour mixture, which is normally at a temperature of about 70° C., is dried, and then caused to flow through a combined cooler and filter unit, where its temperature is reduced to about 20° C., at which temperature no deposition of the solvent occurs, and any dust is removed. The gases then pass over one pair of spirals of a 4-spiral meter, the other pair of spirals being in communication with a compensation chamber containing phosphorus pentoxide, so that these spirals are surrounded by dry air. The percentage of acetone in the mixture is measured directly

on an indicator or a recorder, the usual range being 0-4 per cent. acetone. If the atmosphere of the room in which the meter is installed is contaminated with acetone vapour, arrangements are made for the sealed cells in the meter to

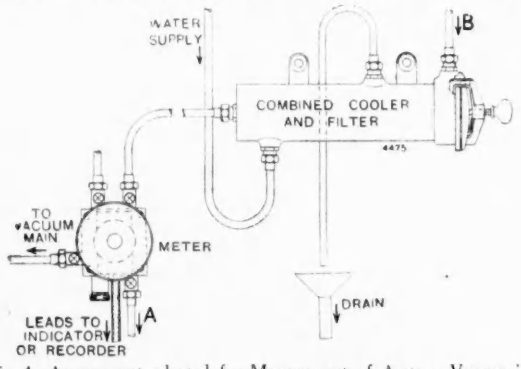


Fig. 4. Arrangement adopted for Measurement of Acetone Vapour in Artificial Silk Industry. A—Outlet through bubbler showing rate of flow. B—Inlet for acetone-air mixture

be flushed out with clean dry air whenever the drying agent has to be changed, thus preventing leakage of acetone into these cells which would vitiate the readings obtained. An aspirator may be used to draw the gases through the pipe line; alternatively connection may be made to a low-pressure main. The rate of flow is controlled by means of a bubbler fitted with a non-return valve.

In connection with the viscose process of manufacturing artificial silk, apparatus may be supplied to measure the percentage of carbon-bisulphide vapour in the exhausting conduits after the formation of cellulose xanthate in the rotating churns. To enable it to withstand the action of the vapour, a steel meter is used. The thermal conductivity method

Fig. 5. A close-up view of the Meter Mounting

of gas analysis may also be applied in connection with the manufacture of industrial alcohol, to measure the vapour concentration at the still heads.

Oxygen in Feed Water

The presence of dissolved oxygen in feed water is largely responsible for the corrosion of boilers, and de-aerating plants are frequently installed to keep the oxygen content down to a low figure, say below 0.1 cubic centimetre per litre of water. To eliminate the risk of the de-aerated water picking up oxygen on its way to the boiler, owing to leaking valves or broken seals on feed or booster pumps, it is desirable to provide means for measuring the amount of oxygen actually present in the water entering the boiler.

The metering unit illustrated in Fig. 6 has been designed and patented for use where mechanical or evaporating types of de-aerators are employed. A small quantity of water from the feed water system is passed through a cooling device and thence round the meter K, through the cock A and into the constant head device, B, which is fitted with an overflow C, thus keeping the water supply constant without exposure to the air. From B the water is passed at a constant rate through a second cock to the scrubber F—a tube filled with extractor rings, where the water is "scrubbed" by a continual flow of pure hydrogen generated in the electrolytic cell M. Hydrogen is substituted for the dissolved oxygen in the feed water, and the relative rates of flow of hydrogen and water are so arranged that the displaced oxygen forms a considerable percentage of the total gas issuing from the top of the scrubber. This percentage is measured by the meter K, which is of the standard type; one of the cells is exposed to the pure hydrogen passing from the electrolytic supply while the other cell is exposed to the gas emerging

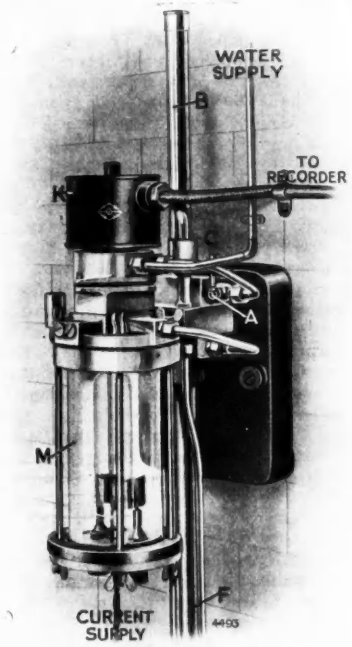


Fig. 6. Metering Unit for Oxygen in Boiler Feed Water

from the scrubber. The meter is kept at a constant temperature by a water jacket through which flows the incoming feed water. The recorder or indicator used with the meter may be calibrated for a range of 0 to 0.5 cc. oxygen per litre of water.

When it is desired to measure the oxygen content at several points in a plant, a metering unit, as illustrated, is supplied for each point, and a multi-point indicator is used.

The British Association

Arrangements for the York Meeting

THE arrangements for the York meeting of the British Association in the first week of September are well advanced. In view of the fourteenth International Physiological Congress at Rome at the same time there will be no meetings of the Physiology Section, but the twelve other divisions will be in activity, in addition to the sub-sections. The president is Sir J. Alfred Ewing, and his address will be: "An Engineer's Outlook."

In addition to an already full programme for the eight days over which the proceedings last an attractive list of visits to famous Yorkshire places has been arranged, as well as several evening lectures. Amongst the sectional presidential addresses are those by Professor Rankine on "Physics in Prospecting for Minerals," by Professor Boswell on "The Ice Age and Man," by Professor Fleure (of Aberystwyth) on "The Geographical Study of Society and World Problems," by Professor Forrester on "Britain's Access to Overseas Markets," by Professor Walker on "The Call to the Engineer to Manage the World," and by Professor Beatrice Edgell on "Current Constructive Theories in Physiology." Lord Rothschild is president of the Zoology Section, and his well-known interest in this branch of science, which extends to a private "zoo," ensures an attractive contribution from him.

Additional Duties on Chemical Products

Effect of Tariff Committee's Recommendations

THE 10 per cent. general tariff, as far as it affects "fully manufactured" articles, was replaced by a 20 per cent. general tariff lasting for not less than twelve months, as from midnight on Monday, April 25. The official standard rate for all articles except those on the free list, and those otherwise taxed, of course remains at 10 per cent. There are, however, some exceptions in which a tariff lower than the 20 per cent. general rate is imposed. Textile yarns will pay only the standard 10 per cent. Some luxury or semi-luxury goods will pay up to 30 per cent. The difficult problem of iron and steel is taken out of general consideration because of its complexity. A rate of 33⅓ per cent., familiar as the rate of the McKenna Duties, is placed upon iron and steel imports for three months pending the detailed consideration of a more scientific differentiation of tariffs upon various classes of iron and steel imports which the Tariff Committee is undertaking at once.

An important fact to be noticed is that the increased general tariff now ceases to be purely a revenue tariff and becomes definitely protective. The new general tariff replaces the Abnormal Imports Duties, which covered a wide range of manufactures and, being as high as 50 per cent., were deliberately meant to stop imports; therefore there is not quite so much practical change as would be the case if the Abnormal Duties had not existed. The new tariff, though it will remain in force in general for at least a year, is not intended as the final form of a scientific tariff. Like the 10 per cent., it is still experimental, as, indeed, is the new fiscal system generally. Within the year the Tariff Committee will have collected sufficient evidence of its effects to be able to adjust the tariff according to different kinds of imports so as to develop it into a scientific tariff.

The New Duties

So far as chemical products are concerned, the Treasury Order giving effect to the Tariff Committee's recommendations, specifies the following charges:—

	Additional duty recommended. Per cent.		Additional duty plus Genl. *ad. val.* duty. Per cent.
Tartaric acid	10	...	20
Cream of tartar	10	...	20
Citric acid	10	...	20
Ammonia, soda, and potash alum	10	...	20
Aluminium sulphate	10	...	20
Ammonium chloride	10	...	20
Lithopone	10	...	20
Acetone	23⅓	...	33⅓
Acetic acid	23⅓	...	33⅓
Vinegar	23⅓	...	33⅓
Acetate of lime	23⅓	...	33⅓
Formaldehyde	23⅓	...	33⅓
Menthol (other than natural menthol)	23⅓	...	33⅓
Boric acid (refined)	10	...	20
Borax (refined)	10	...	20
Nitric acid	10	...	20
Aluminium oxide (hydrated or anhydrous) but not including abrasives	10	...	20
Anhydrous ammonia	10	...	20
Ammonia liquor	10	...	20
Sulphate of ammonia	10	...	20
Nitrate of ammonia	10	...	20
Sodium nitrate	10	...	20
Calcium chloride	10	...	20
Collodion cotton (nitro-cellulose)	10	...	20
Tin oxide	10	...	20
Zinc oxide	10	...	20
Nicotine, nicotine sulphate and nicotine insecticides	10	...	20
Paints and colours prepared and manufactured (including ready-mixed or in paste form, but not including printer's ink, varnishes, lacquers, enamels and dyestuffs)	10	...	20

Views of an I.C.I. Director

Mr. H. J. Mitchell, a director of Imperial Chemical Industries, Ltd., stated in an interview that the scheme put forward by the committee is evidently intended to be a provisional one. He was glad to note that the committee fully recognised, as Imperial Chemical Industries had always done, that the proper organisation and equipment of an industry was fully as important for its well-being as tariff protection. "The scheme," said Mr. Mitchell, "is to be varied, as the result both of the detailed investigations into the conditions of individual industries which the committee declares its intention to make, and of experience in the actual working of the tariff. No doubt there will be dissatisfaction in some quarters where it may be thought that the recommendations are insufficient. But industrialists generally will agree that the committee is right in not plunging at once into a system of high duties, but yet putting an end to the uncertainty which has been hampering many industries, by giving an immediate measure of security. In that connection, one must welcome especially the announcement that the committee is not going to make recommendations for reductions of the duties now imposed for a period of at least a year. On the other hand, industries are to be given the opportunity of making reasoned application for higher duties, and there will be general satisfaction at the committee's promise to deal with all such applications as quickly as possible. A scientifically constructed tariff can obviously be worked out only gradually, but the committee seems to have started on its task in the right way, and in a spirit which will be generally approved and be encouraging to British industry. So far as the chemical industry is concerned, the first instalment will certainly be helpful.

Nitrate Plant in Chile

Developments During 1931

THE year 1931 witnessed the opening of the second Guggenheim process plant in Chile and the definite closing of over 100 small plants using the "Shanks" process. When the Cosach was formed it was thought that the Oficiana Chacabuco would be the only one of the Shanks's type to continue operations. This is the only one operating in the Antofagasta pampa which is practically all cleared of nitrate. However, because of the serious unemployment situation of the Iquique district, two Shanks's plants were opened there. The Oficiana Condor (controlled by French capital) near Iquique is the only plant outside of the Cosach which has continued operation during the year. This plant can operate at the present low prices only because it is working nitrate ores of over 25 per cent. The two Guggenheim plants in operation are able to work ores as low as 9 per cent. of nitrate content. The fourth Shanks's plant which continued operation under the Cosach was near Taltal.

Chemical Deposits in Ireland

Expected Developments

THE deposits of barytes in County Cork are likely to be worked far more extensively than heretofore. Efforts will shortly be made to interest the new Free State Government, under the presidency of Mr. Eamon De Valera, in a scheme for the development of the chemical deposits in Ireland. Already the Mines and Minerals Bill has become law and a Mining Board to deal with matters regarding the efficient and economical working of mineral deposits will be set up in the course of a week or two.

Barytes are available in quantity at Mount Gabriel, near Schull, Luneen Bay, Clonakilty, and Bantry in County Cork. There is also a large deposit at Gleniff, near Bundoran, County Donegal. In the County Wicklow area it is anticipated that the output of iron pyrites, containing 33 to 37 per cent. sulphur, in the Avoca Valley will also be developed considerably for export purposes.

The full report on the mineral resources of the Irish Free State has not yet been completed by the Geological Survey Department but, as soon as this is received by the Executive Council of the Government, rapid action for the development of natural resources will be taken.

Recent Advances in Metal Protection

Coating of Light Metals by Electro Deposits

The subject of metal protection formed the subject of discussion at a recent joint meeting of the Electroplaters' and Depositors' Technical Society and the Institute of Metals. The paper leading to the discussion was presented by Mr. H. Sutton, of the Royal Aircraft Establishment, Farnborough, and was entitled "Some recent advances in protective coatings on metals," excerpts of which are given below.

THE problem of corrosion prevention is to-day receiving more attention than was formerly the case, owing to recognition of its economic importance, both by users and by manufacturers of metal construction. Fundamental research of the types pursued by Evans, Bengough and their collaborators, is providing valuable data and an insight into corrosion problems not previously possible. Due importance is now attached to the influence of oxygen and oxide films, metal potential and differences of potential, the influence of various ions in relation to films present on metals, the nature, properties and distribution of corrosion, etc. The position of the one whose task is the protection of metals and alloys against corrosion is becoming more and more closely interwoven with the study of the fundamental nature and factors of corrosion. The correct choice of a protective coating or treatment is greatly facilitated by knowledge of the corrosive conditions to be faced and the influence of such conditions on metals and alloys. There are, however, many pitfalls for the unwary, and surprises for the most cautious.

Cadmium and Zinc Deposits

Both cadmium and zinc have attained high importance as protective coatings on metals, and are employed effectively for the protection of iron and steel parts. Since the principle upon which the protection afforded mainly depends is that of "sacrificial protection" porosity of the deposits is probably of secondary importance, but experience has shown that the more porous forms of deposit which result, *e.g.*, from the use of too high current density in operating zinc and cadmium cyanide baths, fail signally to yield the high degree of protection available by means of dense finely crystalline deposits. This result is indeed not surprising since the "sacrifice" of the deposit will proceed at varying rates according to the nature of the surface, and in all cases the more porous deposit tends to retain moisture, residues of electrolyte from the plating bath and external corroding agents. It is further recognised that the potentials of metals are influenced by the condition of surface and that the presence of films of insoluble or sparingly soluble substances upon the surface has most striking effect upon the equilibrium potential.

In recent years, there has been a great deal of controversy on the subject of testing the protection afforded by zinc and cadmium coatings, and in this connection the observations of Patterson on the corrosion of zinc exposed to urban atmospheres are of value. Patterson found that the deposit of corrosion product had a retarding effect on the corrosion rate, probably by preventing the direct access of acid rain-water to the metal, and there was a marked difference between the corrosion curves for summer and winter periods. During the winter there was a close relationship between the rain-fall to which the metal was exposed and the outdoor corrosion of zinc, but in the summer this relationship was not maintained. In this connecion, it is of interest to note that Hippensteel, Borgmann and Farnsworth in investigating the atmospheric corrosion of zinc coatings of hot-galvanised type on iron and steel found that an accelerated laboratory test did not show the same similarity in the rates of loss of weight of the different types of coatings tested as that shown by the outdoor exposure tests on similar samples which had practically the same rate of loss of weight for the hot-dipped, heat-treated, hot-dipped and sherardised samples.

Wernick has shown the relationship between weight of cadmium deposit and rate of rusting of the underlying steel, and adduced experimental evidence of the greater protective efficiency of deposits of 0.0003 in. and upwards. Although this experience is not in accord with some of the early claims made by enthusiastic sponsors of cadmium electro-deposits, it is in close agreement with general experience. According to Isgarichev, cadmium electro-deposits are superior to zinc as a protective coating on steel owing to the more inert nature of the oxide of the metal. Davies and Wright found that cadmium deposits gave better protection of steel under a sulphuric acid spray test (0.05 N solution) than zinc deposits, while under a salt spray test (24 gm./litre NaCl) zinc coatings gave the better protection.

Protection by Electro-Deposits

The problem of successfully depositing protective coatings of zinc and cadmium on aluminium alloys has attracted attention largely because of the desirability of protecting from corrosion aircraft and other parts made of these alloys. The earliest experiments with zinc and cadmium electro-deposits on aluminium indicated that as regards corrosion in marine atmospheres, and with the possible exception of cadmium electro-deposits on commercially pure aluminium, the electro-deposits were capable of providing an efficient means of protecting the underlying metal or alloy. In the light of the recent research work of Ebans and his collaborators on the effect of surface films on the potentials of metals and alloys, these experiments are not by any means so surprising.

It appears that any investigator approaching the problem of producing electro-deposits on aluminium and its alloys must inevitably face the important facts of the very high reactivity of aluminium, and the desirability for general convenience and economy of working with aqueous electrolytes. From the experimental work, it became clear that sand-blasting with fine sand offered an effective and practical means of preparing the surface of aluminium or aluminium alloys for electro-deposition processes in which aqueous electrolytes were used. There are potent objections to this form of preparation of surface, *e.g.*, the production of a more or less open surface offering in itself low resistance to corrosion and the more or less dull and unattractive appearance of electro-deposits necessarily resulting from the application of electro-deposits to an unpolished surface. This form of standard surface proved, however, to be satisfactory for the experiments on electrolytes from which to deposit zinc and cadmium. The main features of the buffered zinc sulphate gum arabic bath developed at Farnborough (normal zinc sulphate 0.25 normal sodium acetate, 1 gm./litre gum arabic) are easy maintenance of good working properties as a result of its being well buffered and the presence of an addition agent giving deposits of consistently good texture. In his paper on electric-deposition of zinc on aluminium and its alloys, Cocks mentioned *pH* value of 4 as giving the best results, but subsequent experience has shown that more acid conditions may be used with advantage in depositing zinc on several alloys, and that the range of acidity for successful working of the bath is fairly wide.

Zinc Cyanide Solutions

Zinc cyanide solutions have presented greater difficulties on account of the interaction between the alkali of the electrolyte and the basis metal which was found to occur unless the free cyanide and free alkali contents were kept down to low values. The addition of ammonia to a zinc sodium cyanide bath proved to assist greatly in securing good working properties together with low cyanide content, and in avoiding blistering of the deposits. As shown by Wernick, cadmium deposited from sulphate baths tend to be coarse grained in the absence of addition agents. Planner has described acid cadmium baths, containing fluor-silic, perchloric or phenol-sulphonic acids worked with and without colloids. The study of acid baths and the influence of addition agents appears to be a very fruitful field of research, since at present general practical considerations limit the process of cadmium plating to the use of cyanide electrolytes, which demand careful control for successful operation. An ammoniacal cadmium

cyanide bath similar to the ammoniacal zinc cyanide bath described by Cocks, has proved capable of successful use on light alloy work.

Protection of Aluminium by Cadmium

Cournot and Bary found the best deposits of cadmium on aluminium were obtained by depositing cadmium directly upon the metal, and this appears to be the general experience of investigators working in this field. The Vereinigte Aluminium-Werke recommended preparation of the silumin alloy for cadmium plating by first dipping in 10-20 per cent. solution of cadmium chloride, whereby an immersion-deposit of cadmium, as well as cadmium-dust in loosely adherent form is produced, the latter being subsequently removed by brushing, the work is then plated with cadmium in a sulphate-cyanide bath. Provided that an adequate degree of adhesion of the immersion deposit can be obtained, such a method of preparation of the work offers valuable practical advantages.

Summarising the present position of electro-deposits upon aluminium and aluminium-rich alloys, it appears now definitely established that electro-deposits can be produced by the use of suitable methods of preparing the surface and of suitable baths for the electro-deposition process, which are of practical value not only in protecting the underlying metal or alloy against corrosion, but in rendering the metal or alloy much more attractive in appearance and general behaviour under conditions of use. While we have to-day in this country several recently developed aluminium alloys of moderate and high strength properties and possessing remarkable resistance to tarnishing and corrosion, there appears to be considerable scope for the applications of the electro-deposited form of coating to commercially pure aluminium and the various aluminium-rich alloys.

Considerable advances have been made recently in the use of immersion treatments of iron and steel, using hot solutions of phosphoric acid and phosphates to produce very adherent films of insoluble or sparingly soluble phosphates upon the surface of the metal. In general, the benefit of protective treatments of immersion types is best seen when the thin films so produced are covered by coatings of suitable paints, enamels and varnishes. On the other hand, several processes of this type provide adequate protection to render their application of value where the conditions of exposure are not severe, and several are of distinct decorative value, in addition to imparting to the metal a high degree of resistance to tarnishing. In general, the protection afforded by the films on aluminium resulting from application of immersion processes is of an apparently lower order than that obtained by anodic oxidation treatment.

Anodic Oxidation of Aluminium

Recent experiences of the Bengough-Stuart process have indicated that the benefit obtained by the use of stainless steel cathodes with which the rate of deterioration of the chromic acid electrolyte is much slower than with carbon cathodes, and the necessity for an efficient exhaust system owing to the increased amount of spray evolved, whilst there is necessity for securing complete removal of flux residues from welded parts before treatment in order to avoid local pitting during the treatment.

Some interesting data on the influence of anodic treatment on the corrosion-fatigue properties of anodically treated aluminium and duralumin have been published by McAdam, who found that anodic treatment is not effectual in maintaining the "air endurance limit" of aluminium or duralumin when the material is subjected to corrosive conditions.

Decay in Structural Stonework

The Role of Preservatives

A REPORT on "The Weathering of Natural Building Stones," which has just been issued by the Department of Scientific and Industrial Research, will repay study by those who are in any way responsible for the preservation or restoration of stone structures. The problem has also an important financial aspect, since, according to Sir Frank Baines, the cost to the nation for repairs to public buildings alone, due to the action of atmospheric impurities, has amounted to £55,000,000 to £60,000,000 over twenty-five years. This report summarises the results obtained from investigations at the Department's Building Research Station, where it has been demonstrated that erroneous views are current in the building industry and that definitely harmful practices are commonly in use in ignorance of their damaging effects.

Damage by Sulphur Gases

Under modern conditions, pollution of the atmosphere is an important factor in causing decay. Faulty handling of the material, errors in design, or the use of inappropriate methods for cleaning or restoration, may increase its liability to decay. The inappropriate association of materials may cause one to contribute to the decay of another.

Dealing with atmospheric pollution in its relation to weathering, the report says the production of acid sulphur gases by the combustion of coal causes the greatest damage. The main chemical action of the sulphur acids in the atmosphere is the conversion of calcium or magnesium carbonate in the stone into the corresponding sulphates. These form hard, impermeable skins which tend to blister and flake off, thus developing an ugly form of decay. The formation of this skin does not take place as a rule where the stone is exposed to washing by rain. The beneficial results of such exposure, however, may sometimes be masked by the effects of temperature changes in the mineral constituents of the stone, due to exposure to the sun. In addition to the formation of a surface skin, a breakdown in the internal structure of the stone goes on, often in the form of a powdering of the stone immediately behind the skin. In certain magnesium limestone buildings—in York Minster, for instance—deep holes have been "eaten" into the stone-work in sheltered positions. In some places the holes are over nine inches in depth. These are attributed to the corrosive effect of repeated solution and re-crystallisation of sulphates in the stone.

Preservatives Ineffective

The report holds out little hope of the discovery of a satisfactory preservative which can be applied to stonework. The results obtained with such materials have been disappointing, and the Building Research Station is unable to recommend the use of stone-preservative solutions except for temporary protection in special circumstances. In such cases the use of preparations of undisclosed composition should be avoided. For new buildings and modern buildings in which the stone is still in fairly good condition, washing at regular intervals provides the cheapest and most effective means of preserving stonework in good condition, even in urban areas. Such washing removes the salts largely responsible for decay. The oft-repeated statement that soot deposits form a protection to the stonework is declared to be erroneous. Their removal by washing, the report states, is desirable, since their presence causes decay. Where a more drastic treatment than simple water washing is necessary, the report states that the steam-brush process is very effective and, in competent hands, quite as safe as the more arduous method of scrubbing with water. A warning is given against the use of other materials than water or steam in the cleaning process.

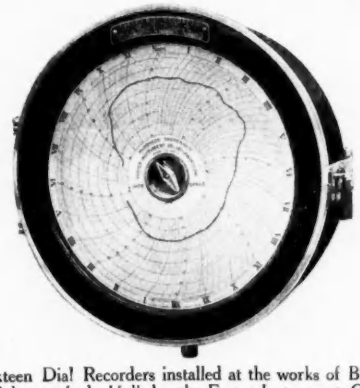
In certain circumstances, the use of plastic materials provides a useful and cheaper alternative to the insertion of new blocks of stone. "If properly executed by experienced workmen, with adequate care as to bonding, plastic repairs can be as permanent as natural stone. They can be made initially to be almost indistinguishable from natural stone, but the appearance resulting from their weathering may differ in time, and the repairs are then liable to become more noticeable." The materials in common use for plastic repairs are oxychloride cements and Portland cement mortars, and the precautions to be taken in using them are discussed in the report.

Developments in Modern Laboratory Equipment

Some Features of Outstanding Interest

The importance of keeping in touch with new developments in laboratory equipment cannot be too strongly emphasised, for even where minor improvements are in question they may be of outstanding interest by increasing the accuracy of the apparatus or by simplifying its method of operation. We give below a selection of trade news brought to our notice by both British and Continental manufacturers during the past month.

PROGRESS which has been made in instruments for the measurement and control of heat is of particular interest to the chemical and allied industries. This matter has received special attention from the Foster Instrument Co., of Letchworth, who have, as the result of over twenty years' experience, evolved a comprehensive range of industrial instruments of the electrical type including thermo-couple, optical and radiation pyrometers, distance thermometers and automatic temperature controllers. The chief difficulty with industrial instruments of this description is the problem of



One of the sixteen Dial Recorders installed at the works of British Industrial Solvents, Ltd., Hull, by the Foster Instrument Co.

mounting the comparatively delicate moving coil system of the indicator or recorder. The currents available being very minute and necessitating the use of extremely fine pivots, the Foster Instrument Co. have produced a special system of spring mounting which protects the pivots and jewelled bearings and cushions them from shocks or vibration in all directions, thus enabling continued accuracy to be obtained under the most severe conditions.

The past twelve months has seen great progress in the design and application of automatic temperature controllers, this company having installed quite a number of plants, the instruments being used automatically to maintain a constant temperature, or in some cases a cycle of temperatures as required for various process work. The instruments can be generally divided into two classes, indicating controllers which serve to regulate the temperature and also give an indication of the actual temperature and secondly, recording controllers which, in addition to regulating and indicating the temperature, provide a permanent record.

In addition to the standard types of industrial pyrometers and thermometers with which our readers are doubtless acquainted the Foster Instrument Co. has now put on the market a range of "contact" or "surface" pyrometers and thermometers which are specially constructed for measuring the temperature of hot surfaces. For the higher temperatures, thermo-electric instruments are used, three standard types of portable pyrometer being available; for the rotating rollers of rubber calenders, paper and textile machines, etc., a flat "strip" thermo-couple is used while a "disc" type couple composed of two rods of dissimilar metals terminating in a copper disc and surrounded by a convection shield is used for hot plates, billets, platens, etc. In each case the indicator is built into a pistol grip type handle, thus providing a robust and self-contained portable instrument; models are also available with the thermo couple head hinged so that the instruments can be conveniently used on hot surfaces difficult of access. For lower temperatures (below 200° C.) contact resistance thermometers are used. These instruments, which measure the temperature by ascertaining the change in resistance of a coil of nickel wire, consist of a suitable containing chamber for the coil of wire and a portable indicator with five inch scale and containing a Wheatstone bridge and small battery; the bulb chamber is connected to the indicator by suitable flexible cable and as the instrument is of the "Foster" patent construction and self-compensating for any change in the battery voltage, readings can be quickly taken without the necessity of making any adjustment or test.

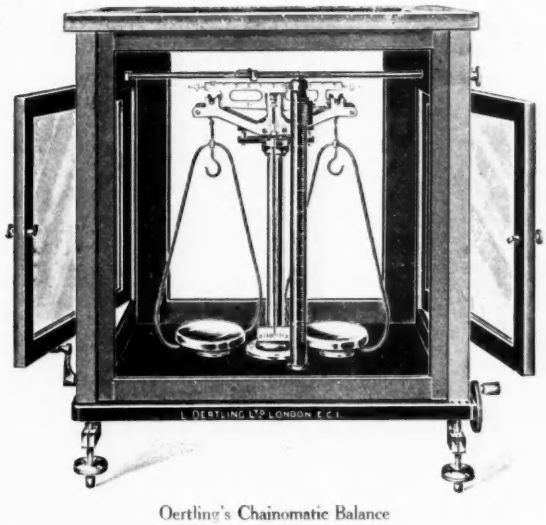
A typical example of instruments working under severe conditions in a highly corrosive atmosphere is the "Foster" installation at the works of British Industrial Solvents, Ltd., Hull. This consists of 16 dial recorders of the type illustrated, which gives a permanent record without the use of ink, 4 multi-point indicating pyrometers and one strip or continuous chart recorder.

A New Model in Balances

Eliminating the Use of Decigram Weights

IT is now over 80 years since the late Mr. L. Oertling founded in London the firm that has become so well known throughout the world as makers of precision balances and weights for all purposes. Very soon after the modest beginning made in 1849 the exceedingly fine craftsmanship of Oertling's instruments began to build up a reputation which to-day can be compared only with that of one or two of the leading Continental balance makers. Oertling's tradition of fine craftmanship in manufacture is still maintained, and the firm has become a leader in the design of precision balances both for highly accurate work and also for special industrial purposes. As a result, however exacting requirements may be, British research chemists and industrial scientists find that their utmost needs are covered by Oertling instruments which are of entirely British manufacture.

The showrooms of the firm, at 65 Holborn Viaduct, provide a permanent exhibition of some of the finest and most interesting examples of the London instrument makers' craft, and all users of balances are cordially invited to inspect, quite apart from whether they may be at the moment considering



Oertling's Chainomatic Balance

the purchase of a balance. Particularly interesting are the chainomatic balances, where the use of small weights is eliminated, their place being taken by a length of fine chain attached to the beam and adjusted without opening the case. Oertling's original chainomatic model, dispensing with weights below 0.1 grams is already very well known, having been installed in the laboratories of numerous Government

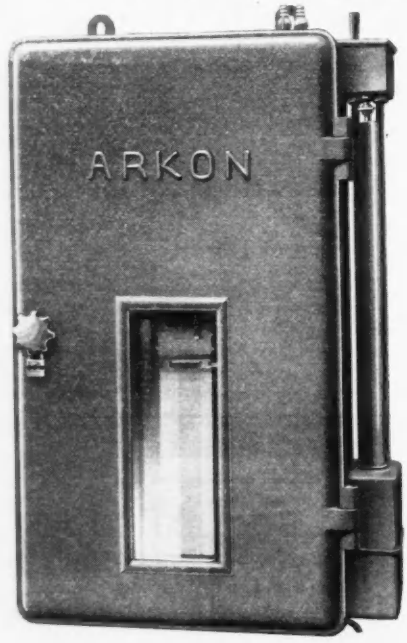
departments, research stations, universities and colleges, as well as by many of the leading industrial undertakings throughout the Empire. A new model (No. 48 GC) is now announced, which entirely eliminates the use of fractional weights. This balance has a rider beam with ten serrations, each serration representing the value of one decigram, while the weighing of milligrams and tenths is covered by the standard chainomatic attachment.

Other interesting examples include a prismatic reflecting balance, where an enlarged image of the illuminated pointer scale, graduated in tenths of milligrams, is projected to a convenient position for observation; and an aperiodic balance fitted with an air damping device which reduces the period of swing to approximately 6 seconds. A full series of catalogues is issued covering Oertling precision balances, and readers who are unable to visit the firm's showrooms are invited to apply for catalogues covering their requirements.

A New Oxygen Recorder

Utilising Catalytic Combustion

ALTHOUGH automatic oxygen recorders would seem to be an essential requirement for furnace plants, seeing that they show the amount of excess air direct, there have always been few types available. In the "Arkon" phosphorus type recorder (Walker, Crosweller and Co., Ltd., 20 Queen Elizabeth Street, London, S.E.1) it could not be overlooked that phosphorus



One of the New "Arkon" Gas Recorders
(Walker, Crosweller and Co. Ltd.)

is very sluggish in absorbing the oxygen (the maximum number of analyses per hour being only 10), and as it requires a room temperature of at least 64° F. to function properly, this type suffered from certain unavoidable defects.

The new "Arkon" oxygen recorder, which is illustrated, does away with these disadvantages. For instance, the analysis speed can be raised to a frequency of 40 per hour, which is better than most CO_2 recorders. A sample of flue gas is measured off and introduced into the combustion chamber by means of a water operated suction device. The oxygen content is then burned by catalytic action with the aid of a reagent such as hydrogen or town gas. The resultant reduction in volume is measured by a comparator vessel and then indicated or recorded. The determination of the O_2 content in this way involves the addition of two parts H_2 to one part O_2, so that the total volume reduction during each cycle of the analysis process is treble the O_2 content. This magnification ensures a large and reliable movement of the pen. Another trouble has also been removed in this new recorder in that the zero adjustment is not subject to fluctuations on account of evaporation of the filling liquid, but is constant and remains correct once it has been set. The current consumption of the combustion chamber is 0.04 kW. The instrument is supplied in three standard ranges, 0 to 20 per cent., 0 to 10 per cent., and 0 to 5 per cent.

Walker, Crosweller and Co. are also suppliers of "Arkon" ring balance gas volume recorders. This new contribution to works control equipment is an application of the differential pressure principle of volume measurement. Its advantages derive from the application of the improved methods of large scale instrument production to the ring balance principle. These two, in combination, result in improvements quite distinct from the advantages contributed separately by each. The range of this instrument can be altered, if and when desired, by the customer simply changing a small weight; further, by having only a very small stroke displacement (volume of the medium taken up or expelled for a given change in readings) it enables a higher standard of accuracy to be obtained. The recorder is safe on static pressures up to 20 atmospheres. Unwinding roll charts, knife-edge bearings, a simple device for checking correct adjustment, and the cast silumin dustproof casing are further points worth noticing. The standard recorder will operate on differential pressures down to ½ in. water gauge, but the makers have already fitted several works with an equipment incorporating it which will measure gas or air velocity from a differential pressure as low as 1/20 in. w.g.

Filters for Extraction Purposes

Applications of Jena Glass

GLASS filter crucibles of Jena glass, as supplied by the Jena Glaswerk Schott and Gen., of Jena, are very suitable also for the extraction of solid substances. A simple extractor of this kind is shown in Fig. 1. Long and slender glass crucibles, or thimbles made altogether of sintered glass may be inserted in the usual *Soxhlet* apparatus, porosity being chosen to fit the coarseness of grade of the powder to be extracted. Where aqueous solutions are to be extracted by liquids lighter than water, various types of "perforators" have been constructed with glass filters fused in. The solvent dropping from the condenser is forced beneath the porous septum and passes upwards through the aqueous phase in tiny bubbles, thus producing a large area in which the two non-mixable liquids are in touch. The simplest form of this kind is shown in Fig. 2. In case the solvent be heavier than water, it is possible to bring about a thorough stirring of the two phases by blowing air, or a neutral gas, from below into the extraction chamber (Fig. 3).

In considering the general use of glass filters for distributing gases in liquids, the bubble size depends on two factors:

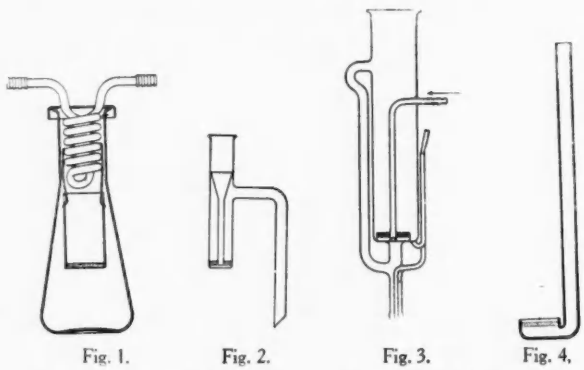


Fig. 1. Fig. 2. Fig. 3. Fig. 4.

(1) the size of pores of the septum and (2) the capillary constant of the liquid. In case capillary active substances are present, the bubble size will be strongly diminished even if coarse grade filters are used. Fig. 4 shows the simplest form of such a gas distributor capable of insertion in any bottle or flask. In Fig. 5 is seen a gas scrubber fitted with such a tube. This type has been used to great advantage for determining nicotine in tobacco smoke and for every kind of

quantitative gas absorption in scientific and technical work. For gas velocities as far as 50 litres of gas per minute a scrubber after Fig. 6 has proved efficient. It has been used for finding the ammonia content of lighting gas (*Gas- und Wasserfach*, 1931, *74*, 121) and for absorbing from the atmosphere traces of volatile poisonous substances, afterwards determining them micro-analytically in the liquid (*Chem. Fabrik*, 1932, *5*, 1). This steaming method of quantitative gas analysis has been found to be the most exact way for deducting traces of dangerous atmospheric constituents, such as mercury vapour, benzene, tatraethyl-lead. For passing through the scrubber large quantities of air at speeds averaging 120 litres per minute the friction is too strong in the pattern, Fig. 6. A new kind of scrubber, Fig. 7, was constructed which permits work at this enormous speed, necessitating a pressure drop of less than 400 mm. water column.

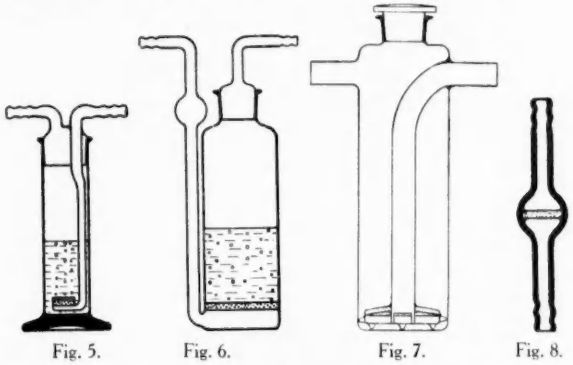


Fig. 5. Fig. 6. Fig. 7. Fig. 8.

To remove dust from gases a glass filter bulb like Fig. 8 may be adopted. The same type, fitted with very fine pores, allows the passage of gas, but not of a layer of mercury lying on top; it may, therefore, be useful as a safety valve in vacuum work (*Ber. D. Chem. Ges.*, 1925, *58*, 2058), as gas is able to bubble through from bottom to top, while the mercury is unable to pass the filter in the reverse direction the moment the vacuum is interrupted. In the same way this kind of valve is appropriate with a carbonic acid Kipp in elementary micro-analysis.

British-Made Instruments

Features of New Models

THE well-known firms of F. E. Becker and Co., 17-29 Hatton Wall, London, E.C.1, and W. and J. George, Ltd., 157 Great Charles Street, Birmingham, have always been to the fore in the manufacture of scientific apparatus and were the pioneers of British-made chemical balances. A visit to their extensive works surprises one with the variety of things which as complete laboratory furnishers they are called upon to manufacture. The range of products is continually being increased and the time cannot be far distant when laboratory workers will be absolutely independent of foreign-made instruments and apparatus. They have always specialised in the manufacture of balances and their latest achievement is the "Nivoc" analytical balance, which, although sensitive to 0.1 milligram, and carrying 200 grams, is now offered at the extremely low price of £11 11s.. It is a first class production, has a Duralium beam and extra wide supports, thus enabling a beaker or flask to be weighed, and a large roomy case with counterpoised sliding front and side opening doors. A complete range of balances varying in price from 29s. 6d. to £45 is also manufactured.

Apart from the usual standard laboratory equipment special apparatus is often required for particular work and these associated firms will undertake the manufacture of such apparatus to specification in metal or glass. Their machine shops are equipped with the most up-to-date plant and they have in their employ some of the most skilled glassblowers available. In addition to the manufacture and supply of equipment they also have their own joinery works for the production of laboratory benches, fume chambers, store cupboards, etc. Upon receipt of a rough plan they will be pleased to submit schemes and suggested arrangements together with estimates without any obligation. Heads of research departments and industrial chemists would do well to study the catalogues issued by this firm and the advantages of dealing direct with the actual manufacturers cannot be too greatly stressed.

Safety in Toxic Atmospheres

Breathing Apparatus of British Manufacture

THE "Vit-Air" industrial gas mask, 1932 pattern, supplied by John Morris (Fire Snow), Ltd., of Mulberry Street, Albert Square, Manchester, marks a great advance over any pattern of gas mask previously made, and is the result of many years' experience in design, manufacture and use. It is made throughout of the very best materials possible to obtain, and may be worn for long periods without discomfort. The normal size of face-piece fits about 90 per cent. of individuals, but a large and a small model are made for abnormally sized faces. The purifying canister (type 10) is of stout metal, 5½ in. deep with an oval cross section of 4½ in. × 2½ in. weighing only 1¼ lb., and is filled with absorbent material, the nature of which varies according to the specific gas, or combination of gases, against which it is designed to afford protection. It is painted a distinctive colour in accordance with the colour scheme laid down by the Home Office, to denote the class of gases or vapours for which its use is intended. It fulfils the requirements of the Home Office Factory Department as regards both construction and performance. The gases, or combination of gases, against which the respective canisters afford protection, are divided into four main groups:—(a) Acid gases, such as bromine, chlorine, phosgene, sulphurous acid, etc.; (b) ammonia; (c) organic vapours, such as acetone, alcohol, aniline, benzol, carbon bisulphide, carbon tetrachloride, methyl alcohol, etc.; (d) nitrous fumes.

Purifying canister (type 20), which is also supplied, is in every respect a super-canister, embodying a highly efficient filter for the absorption of particulate clouds, smoke, dust, etc., notwithstanding which its resistance to breathing is extremely low, being less than 20 millimetres of water column at a flow of 50 litres per minute. This canister is capable

The "Vit-Air" Industrial Gas Mask
(John Morris (Fire Snow), Ltd.)

of absorbing much larger quantities of gas than the type 10 container, and is extremely strong and resistant to rough usage. Containers of this construction, which weigh 2¾ lb., have been subject to dry and wet climatic tests over a period of 4½ years with most satisfactory results.

The "Vit-Air" gas masks are designed to afford protection against specific gases or combination of gases, where there is sufficient oxygen present in the atmosphere to support respiration. They must not be used where the atmosphere is deficient in oxygen or where a high concentration of gas may be expected, and in such cases either smoke helmets, with air pipe, or self-contained oxygen breathing apparatus, must be used.

Adaptable Bosshead Clamp

Making for Accuracy in Setting-Up Apparatus

AMONG the various items of laboratory equipment supplied by Andrew H. Baird, of 33-39 Lothian Street, Edinburgh, there is one device which should be particularly appreciated by laboratory workers. It is a universal bosshead-clamp, known as the "Lothian." This clamp is adaptable for many purposes, and can be used in connection with all kinds of scientific apparatus where accuracy, rigidity and quick setting-up is desired. The device actually consists of two metal blocks, each having a V-shaped groove on its inner surface. These two blocks are separated by a washer, and the three are connected by a screw which is controlled by a winged nut and washer. The upright of, say, a retort stand, is held between one block and washer while the rod of an instrument or a piece of apparatus is gripped by the other. The thicker rod is always placed in the deeper groove. The operating of the clamp, etc., is done with the left hand, while the right hand controls the tightening screw. The universal bosshead-clamp admits of an absolutely universal movement, which is controlled by one screw. The tightening is practically instantaneous, and with it the rigidity of grip is perfect. There is no lost motion. It will grip two rods of the same diameter; it will grip two rods of different diameters.

Metal Laboratory Ware

Platinum, Silver and Staybrite Steel

JOHNSON, MATTHEY AND CO., LTD., of 73-82 Hatton Garden, London, E.C.1, are the leading suppliers of platinum laboratory wear, in the form of crucibles, dishes, tongs, sieves, spatulas, etc. They make crucibles and dishes of all shapes and capacities in platinum, iridio-platinum, rhodio-platinum, silver, platinum-gold, palladium-gold, gold-lined platinum and nickel. In addition they also specialise in chemical plant constructed in silver. In the past the applications of silver to plant construction, either as a pure metal or an alloy, have been relatively small but recently it has rapidly come forward, especially in this country and on the continent, and is now receiving a considerable amount of attention. The properties which make it attractive are its freedom from oxidation, resistance to various commercial acids, remarkably high thermal and electrical conductivities, and excellent mechanical characteristics. Staybrite steel wire in the finer sizes ranging from 26 to 40 S.W.G. is another speciality of this firm, who have developed a process which enables them to supply fully annealed wire with a mirror-like finish.

New Sartorious Features

Further Improvements in Balances

A NEW type of heavily damped balance using no loose weights of less value than 1 gram has been placed on the market by Sartorius-Werke A.G., of Goettingen, who are represented in England by Mr. E. O. Maempel, of Finsbury Pavement House, Moorgate, London, E.C.2. The beam, made of phosphor-bronze, is of the straight Sartorius pattern with the usual type of supports, stirrups and arrestment mechanism. In place of fractional weights, eight separate riders weighing 500, 200, 100, 100, 50, 20, 20, and 10 milligrams are used. The riders, consisting of circular rings of wire are lowered on to a notched rod which is attached to the top of the right-hand stirrup at right angles to the beam. Each rider has its own mechanism for lowering it operated by knobs placed vertically on the right-hand side of the case. A half turn of any knob lowers the corresponding rider and at the same time brings into view a small indicator showing the value of the fractional weight used. Weights of less than 10 milligrams are not used at all, but the sensitivity of the balance is so adjusted that each scale division corresponds to 1 milligram. The scale itself is divided into ten divisions, sub-divided into fifths, on either sde of the zero point. By means of a small electric lamp placed outside the balance case, and a system of lenses and mirrors, an enlarged image of the scale is projected on to ground glass, and the image moves across the field as the pointer swings.

The damping device on this balance consists of a pair of very light aluminium cylinders, closed at the top but open at the bottom; these are suspended from the stirrups and fit loosely into a pair of brass cylinders, open at the top but closed at the bottom and fixed rigidly to the central support of the balance. The clearance between the aluminium and brass cylinders is about 1/16 in., and the damping is produced by the cushion of air inside the cylinders. The wires, by which the pans are suspended from the stirrups, are hinged so that the cylinders always remain concentric even when the weights are placed away from the centre of the pans. Weighings are carried out in the usual manner with the larger weights and the supports are lowered completely after addition of each weight. To use the fractional weights the case is closed, the beam supports are lowered, and the riders are added while the beam is free. The beam does not oscillate but swings slowly to the equilibrium position so that until the correct weight to 1 centigram is added, the scale remains at rest at a point outside the graduations.

A Useful Air Drying Device

Applicable to Balance Cases

THE provision of a dry atmosphere inside the balance case is easily attained by the use of a special drying device which has been introduced by Silica Gel, Ltd., of Bush House, Aldwych, London, W.C.2. The silica gel dryer, as it is styled, consists of a small perforated aluminium container which is filled with silica gel in granular form. Silica gel, it will be recalled, has a physical structure of infinitesimal pores possessing such intense capillary attraction that it will absorb water vapour *i.e.*, moisture, from the air with which it comes into close contact. Not only will it adsorb but it will also hold within its pores as much as 40 per cent. of its own weight in moisture. Silica gel is odourless and has none of the disadvantages of calcium chloride or other chemical dryers, as it remains perfectly dry externally, even when saturated. The Silica gel dryer is regenerated periodically by heating it in a hot oven for one to two hours in order to drive off the adsorbed moisture.

Fume Ducts for Laboratories

Corrosion Resistance up to 300° C

THE efficient ventilation of modern chemical laboratories calls for extensive ducting in conjunction with air conditioning and distributing apparatus. Metal ducts have commonly been used. Owing to the liability to corrode they must be readily accessible for inspection and repair, necessitating in most cases running on the surface of the wall. This applies equally to ducts used in many industrial processes in connection with extraction plant, ejectors, exhausters and for flue stacks. For these purposes Urastone is the modern alternative, providing at moderate cost a permanent installation that remains efficient indefinitely without painting or repair. This material, which is supplied by Cellactite and British Uralite, Ltd., of 296-302 High Holborn, London, W.C.1, is now available in great variety of standard shapes and sizes. Urastone will withstand a temperature of 300° C., and where it has been installed in place of metal, flues are still in perfect condition even after many years of service. "Anthracite" Urastone safely accommodates temperatures up to 500° C.

Society of Glass Technology

Annual Meeting

THE fifteenth annual meeting of the Society of Glass Technology was held at Sheffield University on April 20, when Mr. Edward Mee (London), was re-elected president for the second year in succession. Dr. English and Mr. J. Pearson were elected vice-presidents, and Mr. B. P. Dudding (London) treasurer. After the meeting two papers were read, one by Dr. G. Zotos (Berlin) on "A New Method of Melting Glasses and Silicates," and the other by Mr. R. A. Hacking (Parkgate Iron and Steel Co.) on "Recent Developments in Open Hearth Furnace Design." The basis of Dr. Zotos's new method of melting glass included the control of the flow of the melt in the melting chamber and avoidance of any disturbing hydraulic movement, such as cross-currents and eddies, in the stream of glass, and a symmetrically shaped combustion chamber of any desired length free from stagnant corners and other anomalies.

News from the Allied Industries

Margarine

BENNINGA'S MARGARINE WORKS, whose headquarters are at Leeuwarden, in Friesland, are reported to have purchased a factory site of 175 acres near Mitcham (Surrey). A British company will be founded with a capital of £50,000, and it is expected that the factory will begin production next autumn. It is to have a producing capacity of 200 to 300 tons of margarine per week.

Iron and Steel

A NEW STEEL WORKS IS BEING ERECTED at Sandbeds, Short Heath, by Starkey and Hawker, of Willenhall. A site covering two acres has been secured, and it is hoped to produce about fifty tons of steel weekly. An official of the firm stated that a new company will be formed under the style of Ductile Steels, Ltd., to take over the firm of Starkey and Hawker, although that branch and another branch at Smethwick would be continued. The firm had been large importers of bright strip, but in view of the possibility of a tariff they had decided to manufacture their own. The equipment would be all-British and would include the latest type of cold rolling plant.

Beet Sugar

THE EUROPEAN AREA under sugar beet cultivation—excluding Russia—in 1932-33, is estimated at 3,470,600 acres, according to statistics which have just been published in Berlin. The area under cultivation in Russia alone is estimated at 4,176,127 acres.

IN THE HOUSE OF COMMONS on Monday, April 25, Mr. R. Hall-Caine (Dorset, Eastern) asked the Minister of Agriculture for what reason only 12 of the 18 sugar-beet factories in Great Britain made use of the additional assistance from the Government of the 1s. 3d. per cwt. on sugar available during the past season under the British Sugar Industry (Assistance) Act; what was the cost of this extra assistance; and how it will compare with the cost of remitting an extra 1s. 3d. in excise duty for the production of all sugar-beet factories during the forthcoming season. Sir J. Gilmore replied that there were certain conditions attached to the late Government's offer in respect of home-grown sugar produced during the 1931-32 manufacturing campaign which were not acceptable to six of the 18 beet-sugar factories. The actual payments made under the British Sugar Industry (Assistance) Act, 1931, amounted to approximately £183,300. The estimated cost to the State of the reduction of the excise duty by 1s. 3d. per cwt. of home-grown sugar produced during the forthcoming season was about £425,000.

Rubber

ACCORDING TO INFORMATION FROM BATAVIA, 212 Dutch East Indian rubber plantations, with an acreage of approximately 70,235, have given up tapping completely and 121 other plantations (of 43,672 acres) are restricting their tapping operations. This represents an untapped area of approximately 12 per cent. of the total area under rubber production in 1931, with an output of about 20,000 tons.

THE THREE BIG PROBLEMS of the rubber industry—namely, cost of production, new uses for rubber, and regulation of supplies—were dealt with by Sir Herbert Wright, the retiring chairman, at the annual meeting of the Rubber Growers' Association on April 22. He emphasised the need for amalgamation of estates, but said that the reason so little had been done in this direction at present was that each owner seemed to be more concerned with his own affairs than with the policy of co-operation. One might reasonably expect, however, that there would be many amalgamations in the future. Sir Herbert urged the necessity of finding new uses for rubber, and instanced the many efforts that the Association had made during the past year in this direction. It was, he said, no use producing more rubber to sell at a loss, but rather to find new outlets for the commodity. It was necessary to rectify the position by adopting measures calculated to reduce the huge stocks now on hand, and to increase the permanent demand for rubber, so that the plantation industry might once again be re-established on a profitable basis.

Non-Ferrous Metals

THE INTERNATIONAL TIN COMMITTEE is recommending to the four signatory Governments (Bolivia, Malaya, Netherlands East Indies and Nigeria) a further big cut in production. This cut is to be at the rate of 20,000 tons a year, and will take effect as from June 1 next. This, the official communiquè states, is in substitution for the cut of 8,420 tons a year, referred to in the communiquè issued after the meeting of March 22.

Artificial Silk

A RESOLUTION TO WIND-UP the Bulmer Rayon Co., Ltd., was carried at an extraordinary meeting of the company on April 22, when Mr. A. J. Pryor, who moved the resolution, said that, as the petition for a compulsory liquidation was still before the Court, he was precluded from making any comment on the position. Another resolution, which was also carried, provides for the distribution of shares in the new company to be incorporated under the name of "B. R. Finance Co., Ltd." The chairman said that if the scheme were adopted, permission to deal in the new shares would be sought. Subsequent meetings of the different classes of shares were then held, at which the appropriate resolutions were also carried.

China Clay

THE MARKED FALL IN PROFITS shown by the latest accounts of English China Clays, Ltd., should not come as a surprise to shareholders. Last year the beginnings of the price fall and a heavy contraction in the volume of business brought profits down from their peak figure of £163,989 to £105,176: but it was then evident that this drop reflected only the first effects of the slump, for at the end of 1930 the winding-up of the China Clay Associations left the industry—with a capacity far exceeding possible demand—at the mercy of unrestricted competition. Both prices and turnover have slumped further, and despite the extensive economies and internal reorganisations effected in 1930, the company's earnings have dropped to £14,892. This, however, is appreciably better than in 1921, when there was a loss of £32,102.

Mr. H. J. Pooley's Tragic Bereavement

Elder Son killed while Motor Cycling

HIS many friends in the chemical industry will learn with profound grief of the tragic loss which Mr. H. J. Pooley, secretary of the Society of Chemical Industry, sustained on Saturday, April 23, when his elder son, Mr. Brian Jeffries Pooley, aged 25, was killed in a motor cycling accident. Mr. Brian Pooley, who was attached to the sales department of Joseph Crosfield and Son, Ltd., of Warrington, and lived at Ashton Lodge, Abercrombie Street, Chesterfield, was riding a motor cycle at Longsdon cross roads, near Leek, Staffs., having as pillion passenger Miss Betty Correns, of Hollingwood Hotel, Chesterfield, when he came into collision with a motor lorry owned by Whittles and Son, corn merchants, Leek, and driven by Harry Hayes, of Leek. Both Mr. Pooley and his passenger were thrown from the machine, and it is believed that Mr. Pooley broke his neck. Miss Correns received injuries and was removed to the Leek Memorial Cottage Hospital.

The inquest on Mr. Pooley was opened at Leek Town Hall on Monday. The Coroner (Mr. S. A. H. Burne) adjourned the inquiry to a date to be fixed, in order that Miss Correns might be able to give evidence.

Evidence of identification was given by Mr. H. J. Pooley, the father, of 23 Clifton Avenue, Finchley, who said his son had been driving since he was 14 years old and was a very careful driver, and he thought he knew the district well.

Superintendent C. A. Clarke said the pillion passenger was suffering from shock and did not yet know of Pooley's death.

Miss Correns has been removed to Chesterfield.

The funeral took place at Hendon Park Cemetery on Wednesday afternoon, following a service at the Finchley Parish Church.

Improvements in Non-Corrodible Steels

Lantern Lecture at Derby

THE Nottingham Section of the Society of Chemical Industry was well represented at a meeting held at the Derby Technical College, under the auspices of the Derby Chemists' Joint Committee on April 21, when a lecture was given on "Recent Improvements in Non-Corrodible Steels for Domestic and Industrial Uses," by Mr. J. A. Clements, F.I.C., of the Brown-Firth Research Laboratories, Sheffield. Sir John Ferguson Bell presided.

Mr. Clements briefly dealt with the technical characteristics of the stainless steels of the 12/14 per cent. chromium type, which are essentially martensitic in character, and then passed on to show the developments of the steels containing high percentages of chromium associated with nickel. The development of such steels has widened, to a great degree, the purposes to which stainless steels can be applied, since, by their greater ductility and ease of fabrication, plant can be constructed which was formerly impossible.

The lecturer indicated how rapid the progress had been with these steels within the last seven years. Based upon the experience and scientific work of various investigators, improvements of a substantial character had been attained. Perhaps the most notable of these were the results obtained by the introduction of small percentages of other elements to the alloy which is familiarly known as the 18/8 composition. This is more particularly applied to the elimination of the feature known as inter-crystalline corrosion, or weld decay and it could now be said that this undesirable feature had been definitely overcome.

Many researches had been conducted by different investigators, and good results had been obtained, notably by the addition of relatively small amounts of vanadium, silicon, tungsten and titanium, the last named being perhaps the mose efficient element to use. The fact that steels are now available which are not liable to inter-crystalline corrosion is of great importance to chemical engineers, in that plant of large size can be fabricated without the need of subsequent heat-treatment.

Mr. Clements concluded by indicating how the modern steels could be applied, with great benefit, to such industries as the food industry, the dairy industry and for heavy chemical plant, and he urged that the fullest co-operation should exist between the users of the steels and the steel makers. The lecture was illustrated by lantern slides.

The discussion was opened by Sir Henry Fowler, president of the Institute of Metals.

Chemical Industry Lawn Tennis Tournament

Entries Close Next Monday

NEXT Monday, May 2, is the final date for receiving entries for the Chemical Industry Lawn Tennis Tournament. The tournament is limited to men's doubles and is open to all engaged in any capacity in the chemical industry throughout the country. Players who have not yet despatched their entry forms are asked to do so forthwith in order that the tournament shall be as representative as possible of the chemical interests of the country.

Rules

1. Every competitor must be a member of the chemical industry, either as a principal or a member of a staff. There is no entrance fee of any kind.
2. Each pair must be members of the same, or an associated, firm.
3. The Challenge Cup shall be competed for annually on courts of any surface in accordance with the Rules of Lawn Tennis and the Regulations of the Lawn Tennis Association. The winners of the Cup shall make arrangements for its safe custody and insurance.
4. The competition shall be conducted on the knock-out principle, and the best of three advantage sets shall be played in all matches.
5. **Entries shall be made not later than May 2, 1932, and addressed:**

"Lawn Tennis Tournament,"
"The Chemical Age,"
Bouverie House,
Fleet Street, London, E.C.4.

6. The draw shall be made on the first convenient day following the close of entries. The dates on or within which the several rounds must be played will be published in THE CHEMICAL AGE.
7. The Editor of THE CHEMICAL AGE shall have the right to scratch any players who fail to play off their matches by the stipulated dates, or who otherwise fail to conform with the rules and regulations governing this competition.
8. Except in the case of the special period set apart for the final stages of the competition, players drawn against each other must make their own arrangements for playing off their match on a court mutually agreed upon. In the event of disagreement, the first name drawn shall have the right to choose the ground.
9. In the general interests of competitors throughout the country it has been decided to divide into areas as far as possible all matches up to, and including, the Semi-Finals, the rule as stated under Clause 8, however, still standing.
10. The result of each match must be sent by the winners to the Editor of THE CHEMICAL AGE, signed by all four players (winners and losers) immediately after the match, and must reach the office of THE CHEMICAL AGE not later than by the first post on the day following the final day for playing off the round.
11. If any player be not present at the agreed place or time of the match, opponents shall be entitled to a walk-over, after having allowed reasonable time (say, a maximum of one hour) for the others' appearance. If the players find it impossible to play off their match on the day originally chosen, they must play it on any other day, to which both sides agree, within the stipulated period.
12. Any dispute arising between players, or otherwise, shall be referred to the arbitration of the Editor of THE CHEMICAL AGE, whose decision shall be final.
13. While competitors will make their own arrangements as to hard or grass courts for the preliminary rounds, it must be understood that the Finals will be played on hard courts.

[The Latest Date for Receiving Entries is May 2, 1932].

Cut along this line and post as directed.

Entry Form

We have read the Rules of THE CHEMICAL AGE Lawn Tennis Tournament, and agree to abide by them.

Name of Competitor ..... *Name of Competitor* .....

Name of Firm..... *Name of Firm*.....

Firm's Address..... *Firm's Address*.....

....

Telephone No. ..... *Telephone No.* .....

From Week to Week

NEW POTASH DEPOSITS have been discovered at Sagis, in the Ural area (Russia), at a depth of 1,600 feet. The salt is reported to contain 10 to 15 per cent. of potash.

THE COMPLETE NATIONALISATION of the medical services was demanded by the National Union of Drug and Chemical Workers at their thirteenth bi-annual meeting, which took place in London on April 22-23.

THE IRISH FREE STATE GOVERNMENT is considering the opening of an explosives factory in Dublin. When interviewed, a member of the trade in Dublin said he doubted the success of this project as most of the Irish business is in the hands of I.C.I. Explosives, Ltd.

PLANT FOR THE MANUFACTURE OF POWDERED MILK is being installed at the Suir Island, Limerick, factory of the Clonmel Creamery Company. It is understood that the major part of the production will be used by a Dublin firm of chocolate manufacturers.

LANGDALE'S CHEMICAL MANURE CO., LTD., will continue to operate even if the negotiations with Newcastle Corporation to buy the land and property at their St. Lawrence Road works are completed. In the event of a sale the business will be gradually transferred to another site without interruption to manufacturing and delivery.

A DECREE HAS BEEN ISSUED in Poland, which will remain in force until 1937, to empower the Minister of Commerce to regulate the production and marketing of oil both at home and abroad, including prices and customs duties, and to establish an oil trust for the export of oil abroad. If the oil producers do not themselves set up this trust voluntarily within the next six months the Government will establish it.

VISCOUNT FALMOUTH, who in June last year undertook the charge of the English Steel Corporation Works at Sheffield, has requested to be relieved of that appointment on account of his other engagements. He has agreed to become deputy-chairman of the Corporation. The directors have appointed Commander C. W. Craven, managing director of works and shipyards of Vickers-Armstrongs, Ltd., to be managing director.

THE ANNUAL MAY LECTURE of the Institute of Metals will be delivered by Professor Dr. F. Körber (Director, Kaiser Wilhelm-Institut für Eisenforschung, Düsseldorf), on Wednesday, May 11, at 8 p.m., at the Institution of Mechanical Engineers, Storey's Gate, Westminster, London, S.W.1, the subject of the lecture being "The Plastic Deformation of Metals." Cards of invitation to the lecture may be obtained from Mr. G. Shaw Scott, M.Sc., 36 Victoria Street, S.W.1, together with membership application forms and particulars of the Institute's activities.

THE RULES OF THE INTERNATIONAL ALUMINIUM COMPETITION, 1932, are now obtainable from the Aluminium Propaganda Bureau, 23 bis Rue de Balzac, Paris, or from The British Aluminium Co., Ltd., Adelaide House, King William Street, London, E.C.4. This competition, open to persons of any nationality, will be held by the International Aluminium Bureau with the object of encouraging the development of the aluminium industry. Prizes are offered for the best suggestions dealing with the construction of new apparatus, or with improved applications of the metal or its alloys, or with improvements in manipulation, with the object of developing the uses of these metals. The suggestions submitted must deal with the manufacture of an article, a machine, or part of a machine, in aluminium or one of its alloys, or with an improvement in the working or use of the metal (welding, insulation, surface finish, etc.). The adjudicating committee will be composed of five engineers, one each being nominated by each company associated with the Alliance Aluminium Cie., and, in addition, one member nominated by the director of the International Aluminium Bureau, making in all six members. Prizes totalling 20,000 Swiss francs will be divided by the committee in the month of December, 1932, among the authors of the best proposals. The decision of the committee regarding the division of prizes will be final, with the condition that at least three prizes will be awarded, and no prize will be less than 2,000 Swiss francs. The opening date of the competition will be July 1. Entries must be submitted between that date and October 1, 1932.

THE UNITED STATES SENATE FINANCE COMMITTEE has refused to eliminate the petroleum tariff which the House of Representatives decided should be struck out. The Committee has also voted for an import duty on copper.

MR. A. T. S. ZEALLY, works manager of Imperial Chemical Industries (Fertiliser and Synthetic Products), Ltd., Billingham-on-Tees, has been elected chairman of the Billingham Urban District Council.

SENOR ARTURO ALLESSANDRI has been chosen to lead the political campaign for the dissolution of the nitrate combine, Cosach. All parties of the Left have agreed to adopt the same programme on this issue as Senor Allessandri in his unsuccessful presidential campaign in October.

THE ANNUAL MEETING of the West Riding Section of the Society of Dyers and Colourists was held at Bradford on April 21. Mr. W. P. Walker was re-elected chairman, Mr. F. Wilson, vice-chairman, and Mr. R. Grice, hon. secretary. The following were elected to the committee: C. O. Clark, L. Turner, C. W. Holland, and F. L. Goodall.

LORD MELCHETT underwent an abdominal operation on April 23 at his hotel in Jerusalem. Lord Melchett arrived in Palestine on March 22. He is staying there some time on family business. Together with Lady Melchett he laid the foundation stone of a memorial to his father at Tel Mond, the plantation area owned by Palestine Plantations, Ltd., which was founded by the late Lord Melchett.

THE WORKS of Babcock and Wilcox, Ltd., at Lincoln, which provide employment for over 500 people, are to be closed down, and the work formerly done there will be taken to Renfrew, Dumbarton, and Oldbury. Although it is not yet known how many of the employees will be thrown out of work, the general impression is that only certain members of the administrative staff and a few key men will be retained.

THE IRISH FREE STATE imported chemicals, drugs, perfumery, dyes, colours and fertilisers during the month of February, 1932, to the value of £185,224, an increase of £15,753 on the corresponding period of last year. In the same month exports from the Free State of similar classes of goods were valued at £7,235, as compared with £6,229 in February of 1931.

CONTRARY TO REPORTS PUBLISHED in the German press, it is announced that the French Government has no intention of denouncing the contract concluded in 1927 between it and the Swedish Match Trust. It is stated in connection with the French match monopoly that the Government desires to modify the agreement with the Société Francais-Afrique, a Kreuger subsidiary, which has the right to distribute in France certain kinds of matches under a contract with the Société Allumettière Franchise.

ON THE RECOMMENDATION of its factory sites committee, Gillingham (Kent) Corporation has decided to sell eleven acres of land to the Chemical Trust of Great Britain, Ltd., as a site for a new factory. The purchase price of the site is £4,000. The Chemical Trust of Great Britain, Ltd., is a British concern and was registered as a private company on August 17, 1931. It includes two separate manufacturing companies, with Continental, Canadian and American connections. Two of the company's factories are to be transferred to Gillingham.

MANCHESTER CITY COUNCIL is again offering a number of scholarships tenable in the Faculty of Technology of the University of Manchester. Successful candidates are required to follow a full-time course leading to the degree of Bachelor of Technical Science in the College of Technology, and Matriculation or its equivalent is an essential qualification. For students who have been engaged in industry, and who have attended part-time day or evening classes, the scholarships are of the value of £100 per annum, while for students leaving secondary or central schools the value is £60. Both classes of scholarships are tenable for three years.

Obituary

MR. EDWARD ARMSTRONG JOHNSON, at Enniscorthy, County Wexford, at the age of 86. Mr. Johnson was a keen research worker on the mineral chemical resources of Ireland and also had an excellent command of several eastern languages. During his early career he spent some time in Egypt and for his services was awarded the title Lewa Pasha.

Weekly Prices of British Chemical Products

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE *by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.*

THE position of the London chemical market is generally unchanged, although in view of the new import duties prices of certain chemicals are likely to advance. Business has been quiet and steady, with little change up to the present. The market for coal tar products remains firm, and prices are unchanged from last week. The lowering of the tariff rates on a number of chemical products which have been within the provisions of the Abnormal Importations Act, and the increase in the rates on a number of others from the general 10 per cent. to 20 and 33⅓ per cent. have rather taken the Manchester chemical market by surprise during the past week, and whilst it is too early as yet to judge of the practical results, the general opinion is that in most instances the increase will make for a firming-up of quotations. Meanwhile, prices have continued steady virtually all round, although so far as new orders are concerned, business has been on rather quiet lines. There has been renewed activity in the Scottish heavy chemical market.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 40%, £19 15s. per ton d/d address U.K. in casks. London: Tech. 80%, £37 5s to £39 5s.; pure 80%, £38 5s. to £40 5s. SCOTLAND: Glacial 98/100%, £48 to £50; pure 80%, £38 5s.; technical 80%, £37 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID, CITRIC.—1s. 1d. per lb. LONDON: 1s. 1d., less 5%. MANCHESTER: 1s. 1d. to 1s. 1½d.

ACID, CRESYLIC.—97/99%, 1s. 7d. to 1s. 9d. per gal.; 99/100%, 1s. 10d. to 2s.

ACID FORMIC.—LONDON: £50 per ton. *£52.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £23 10s. per ton; 50% by weight, £27 10s.; pale tech., 50% by vol., £27; 50% by weight, £32; 80% by weight, £52; edible, 50% by vol., £40. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £20 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £50 per ton in casks, £51 10s. in kegs, *£52 in casks d/d. SCOTLAND: 98/100%, £50 to £53 ex store. MANCHESTER: £2 10s. per cwt., ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. 1d. per lb. SCOTLAND: B.P. crystals, 1s. 1¾d. to 1s. 2d. less 5% carriage paid. MANCHESTER: 1s. 0¾d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton according to quality and quantity. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d, according to quantity.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, packed in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton, carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—SCOTLAND: Spot £27 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £24 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £26 10s. f.o.r. mines. SCOTLAND: White powdered £27 ex wharf; spot, £27 10s. ex store. MANCHESTER: White powdered Cornish, £26 10s. at mines.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARIUM CHLORIDE.—£11 to £11 10s. per ton.

BISULPHIDE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, powder £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums. SCOTLAND: £5 5s. to £5 15s., according to quantity and point of delivery.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—4½d. to 5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £19 10s. per ton d/d U.K.

COPPERAS GREEN.—SCOTLAND: £3 15s. per ton, f.o.r., or ex works.

CREAM OF TARTAR.—LONDON: £5 2s. 6d. to £5 3s. 6d. per cwt.

FORMALDEHYDE.—LONDON: £28 to £28 10s. per ton. *£30. SCOTLAND: 40%, £28 10s. ex store.

HYDROGEN PEROXIDE.—LONDON: *100 vols. 10d. per lb.

LAMPBLACK.—£46 to £50 per ton.

LEAD ACETATE.—LONDON: White £42 to £44 per ton. Brown £1 per ton less. *£40 and £39 respectively ex wharf London. SCOTLAND: White Crystals £42 to £44 c.i.f. U.K. ports. Brown £1 per ton less. MANCHESTER: White, £38, Brown, £36 10s.

LEAD, NITRATE.—LONDON: £28 10s. to £29 per ton; MANCHESTER: £28 10s.

LEAD, RED.—SCOTLAND: £28 10s. per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £20 to £22 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial quality 64 O.P., 1s. 8d. to 2s. 3d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

NICKEL SULPHATE.—£38 per ton d/d.

PHENOL.—LONDON: *7d. per lb.

POTASH CAUSTIC.—£30 to £33 per ton. LONDON and MANCHESTER: £42.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports with allowance for contracts. MANCHESTER: 5d.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store. LONDON: £31 10s. to £32 10s. MANCHESTER: £31 to £32.

POTASSIUM CHLORATE.—3¾d. per lb. export London in 1-cwt. kegs. LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £34. MANCHESTER: £35.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £28 per ton c.i.f U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9d. per lb. SCOTLAND: B.P. crystals, 8¼d. MANCHESTER: Commercial, 8d.; B.P., 8¾d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SACCHARIN.—The reduction of 6s. per lb. announced in the Budget is being passed on in full to consumers so that 550 insoluble is now 37s. 6d. per lb. duty paid, packing inclusive, delivery free U.K., instead of 43s. 6d. Soluble 500 remains at 2s. per lb. less, and the usual scale of rebates still applies for total deliveries in 12 months, subject to falling clause, duty being invoiced in all cases at the prevailing rate on the day of delivery.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d address in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99% £17 10s. in drums, £18 15s. in casks. Solid 76/77% £14 10s. in drums. 70/72% £14 12s. 6d. carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £12 15s. to £14 contracts.

SODA CRYSTALS.—Spot £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

* Prices quoted by other manufacturers.

SODIUM ACETATE.—97/98%, £21 per ton.
SODIUM BICARBONATE.—Refined spot £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.
SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.
SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—2¾d. per lb. LONDON: £30 per ton. *£32 10s. MANCHESTER: £29 to £30.
SODIUM CHROMATE.—3½d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.
SODIUM NITRITE.—Spot £19 to £22 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: *10d. per lb.
SODIUM PHOSPHATE.—£13 to £15 per ton f.o.r. London casks free. LONDON: Dibasic, £13 per ton. MANCHESTER: £13 10s.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 6d.
SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.
SODIUM SULPHIDE.—Solid 60/62% Spot £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11 10s.; commercial, £8.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £18 per ton f.o.b.
SULPHUR.—£12 5s. to £15 15s. per ton. SCOTLAND: Flowers, £12 10s.; roll, £12 10s.; rock, £9. Ground American, £12 ex store.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 6s. 4d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON and SCOTLAND: £12 per ton.
ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—5½d. to 6½d. per lb. Crude, 60's 1s. 5½d. to 1s. 6½d. per gal. SCOTLAND: Sixties, 1s. 7d. to 1s. 8d.
ACID, CRESYLIC.—99/100, 1s. 7d. per gal.; B.P., 2s. to 2s. 3d.; Refined, 1s. 10d. to 2s.; Pale, 98%, 1s. 7d. to 1s. 8d.; Dark, 1s. 4d. to 1s. 4½d. LONDON: 98/100%, 1s. 6d. Dark 95/97%, 1s. 4d. SCOTLAND: Pale 99/100%, 1s. 3½d. to 1s. 4½d.; 97/99%, 1s. 1½d. to 1s. 2½d.; dark 97/99%, 1s. 0½d. to 1s. 1½d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude 7d. to 7½d. per gal. Standard motor, 1s. 2d. to 1s. 3d.; 90%, 1s. 3d. to 1s. 4d. Pure, 1s. 6d. to 1s. 7d. LONDON: Motor, 1s. 5½d. SCOTLAND: Motor, 1s. 3½d. to 1s. 4½d.; 90%, 1s. 9½d. to 1s. 10½d.
CREOSOTE.—Standard for export, 4¾d. to 5d. nett per gal. f.o.b. for Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 3¾d. to 4¾d. SCOTLAND: Specification oils, 3¾d. to 4¼d.; washed oil, 4d. to 4½d.; light, 4d. to 4½d.; heavy, 4½d. to 5d.
NAPHTHA.—Solvent, 90/160, 1s. 3d. to 1s. 4d. per gal.; 95/160, 1s. 4½d.; 90/190, 11d. to 1s. 1d. LONDON: Solvent, 1s. 1½d. to 1s. 2d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160, 1s. 3d. to 1s. 3½d.; 90/190, 1s. 1d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 65s. to 70s.
PYRIDINE.—90/140, 3s. 9d. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 3s. to 4s.
REFINED COAL TAR.—SCOTLAND: 5d. to 5½d. per gal.
TOLUOL.—90%, 2s. 2d. per gal.; Pure, 2s. 7d.
XYLOL.—1s. 9d. per gal.; Pure, 1s. 11d.

Intermediates and Dyes

IN the following list of Intermediates delivered prices include packages except where otherwise stated:—
ACID, BENZOIC, B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
ACID, SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL.—34.5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 2d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8½d. per lb.
DINITROTOLUENE.—48/50° C., 8¼d. per lb.; 66/68° C., 9d. per lb.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £75 per ton in 1-ton lots, d/d buyer's works.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 10d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 9d. per lb., d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 6d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. per ton. Grey, £12. Liquor, 8d. to 9d. per gal. MANCHESTER: Brown, £7 5s.; grey, £11.
ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £17 15s. per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—95s. to 100s. per cwt.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gal.
WOOD CREOSOTE.—1s. to 2s. 6d. per gal., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.
WOOD TAR.—£2 10s. to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Latest Oil Prices

LONDON, April 27.—LINSEED OIL was quiet. Spot, £16 10s.; May, £13 12s. 6d.; May-August, £14; September-December, £15 2s. 6d.; Jan.-April, £16 2s. 6d. per ton, naked. RAPE OIL was slow. Crude extracted, £29; technical refined, £31 per ton, naked, ex wharf. COTTON OIL was inactive. Egyptian crude, £20; refined common edible, £23 10s.; and deodorised, £25 10s. per ton, naked, ex mill. TURPENTINE was steady. American, spot, 57s. 6d.; June, 53s. 6d. per cwt.

HULL.—LINSEED OIL, spot, closed at £13 7s. 6d. per ton; April at £12 17s. 6d.; May-August, at £13 10s.; Sept.-Dec., at £14 10s. COTTON OIL, Egyptian, crude, £19 10s.; edible, refined spot, and technical spot, £21 10s.; deodorised, £23 10s. naked. PALM KERNEL OIL, crude, f.m.q., spot, £21 15s., naked. GROUNDNUT OIL, crushed/extracted, spot, £33 10s.; deodorised, £37 10s. RAPE OIL, crushed/extracted, spot, £28 10s.; refined, £30 10s. SOYA OIL, crushed-extracted, spot, £19 5s.; deodorised, £22 15s. per ton. COD OIL, nominal. CASTOR OIL, pharmacy, spot, 43s. 6d.; first, 38s. 6d.; second, 34s. 6d. per cwt. TURPENTINE, American, spot, 57s. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The height of the consuming season in Northern Europe is now passed, and as supplies appear to be plentiful the market is showing a weakening tendency, and the price has fallen from £5 5s. to £5 per ton f.o.b. U.K. port in single bags. As the season advances it appears likely that the market may weaken a little further. *Home.*—The home price remains unchanged at £7 per ton delivered in 6-ton lots to consumers' nearest station.

IMPORTED NITRATE OF SODA.—Continues to be offered at £9 per ton delivered in 6-ton lots to consumer's nearest station. Consumption in the United Kingdom is expected to show a substantial fall in view of the lower prices at which other fertilisers are being offered. A fair supply of British nitrate is available for farmers at the same price as for the Chilean product.

NITRO-CHALK.—The demand continues brisk, and the price remains unchanged at £7 5s. per ton delivered in 6-ton lots to consumers' nearest station.

* Prices quoted by other manufacturers.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. at 1s. each.

Abstracts of Accepted Specifications

364,655. Hydrocarbons. J. Y. Johnson, London. From *I. G. Farbenindustrie.*

Paraffin wax, crude petroleum, tars, and distillation products are heated to 200°-475° C. at a pressure of 30-200 atmospheres with hydrogen or gases containing or yielding it, in the presence of iron which has been activated with cobalt or nickel. This is prepared by impregnating iron oxide with a cobalt or nickel salt, or by precipitating the mixed solutions, the iron compound being reduced in the subsequent treatment. The hydrocarbons are thus desulphurised and hydrogenated.

364,663. Tin Oxide Gels. Silica Gel Corporation, 1800 Baltimore Trust Building, Baltimore, U.S.A. Assignees of E. H. Barclay.

Tin oxide gels are obtained by treating the chloride, with or without a titanium or iron salt, with ammonia to obtain a mixture having an acidity between 0.13 and 0.18 N which sets to a hydro-gel on standing. Mixed gels containing also aluminium, silicon, or tungsten oxides are obtained by treating a tin salt with an aluminate, tungstate, or silicate. The gels may be washed, then dried at 100° C., and then at slowly increasing temperatures.

365,102. Polymerising Organic Compounds. Imperial Chemical Industries, Ltd., Millbank, London.

Organic substances such as isoprene, butadiences, styrene, indene, vinyl acetate and bromide, and others, are polymerised with or without heat and catalysts at pressures up to 25,000 atmospheres. A suitable pressure vessel consists of a block of chrome-vanadium steel 6 in. in diameter with a 1 in. hole drilled in it. A number of examples are given.

365,214. Amines. J. Y. Johnson, London. From *I. G. Farbenindustrie* Akt.-Ges., Frankfort-on-Main, Germany.

Unsaturated carbonyl compounds containing at least 5 carbon atoms are condensed with primary amines and simultaneously or subsequently treated in the liquid phase with hydrogen under pressure. Catalysts may be finely divided metals of the 8th group which are activated by adding metal oxides or substances having a weakly acid or weakly alkaline reaction. Examples are given of the condensation of ethyl-propyl acrolein with ammonia or ethyl hexylamine, and other similar reactions, and examples are given of the preparation of the catalysts.

365,084. Metal Carboxylates and Oil Driers. A. E. Melhuish, London. From Resinous Products and Chemical Co., Inc., 222 West Washington Square, Philadelphia, U.S.A.

Cobalt, lead, manganese, iron, vanadium, cadmium, tin, nickel, chromium, copper, zinc or aluminium salts of a benzoic acid in which at least one nuclear hydrogen atom is replaced by a hydrocarbon radicle are used as driers for linseed or tung oil or resinous or other products derived from the oils. These salts are obtained by double decomposition of the sodium or potassium salts of the organic acids and soluble salts of the metals, or by fusing the free acids with the metal oxide, hydroxide or carbonate. Suitable acids are toluic acids, propyl or isopropyl benzoic acids, *o*-, *m*- or *p*-butyl or phenyl benzoic acids, mesitylenic acid, and α or β-naphthoic acids, or derivatives in which the hydrogen in the substitution group is replaced by an alkyl or aryl group. A number of examples are given.

364,586. Destructive Hydrogenation. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges.

Tars, mineral oils or their distillation, or cracking products or residues are cracked or hydrogenated in the presence of catalysts obtained by thermal decomposition of carbonyls of chromium, molybdenum or tungsten, with or without carbonyls of iron, nickel or cobalt. Carriers may be present, such as hydroxides, carbonates, borates, silicates or phosphates of the metals of groups 1-3 of the periodic system. The vaporised carbonyl may be passed through a tube containing the heated carrier, or the carrier may be impregnated with a solution of the carbonyl. A catalyst suitable for cracking paraffin wax at 520° C. is obtained by heating pumice coated with magnesium oxide and impregnated with a solution of molybdenum hexacarbonyl in benzene.

365,038. Salts and Esters of Keto-acids; Oil Driers. W. W. Triggs, London. From Resinous Products and Chemical Co., Inc., 222 West Washington Square, Philadelphia, U.S.A.

Non-aromatic petroleum hydrocarbons are condensed with the anhydrides of polybasic acids and then the alkali metal or ammonium salts of the keto-acids are treated with heavy metal salts, the resulting heavy metal salts of the keto-acids being purified by solution in a volatile organic solvent. The salts are soluble in toluene, drying oils and turpentine, and accelerate the drying of oils and varnishes. The copper and mercury salts may be used for impregnating marine piling and for varnishing ships' bottoms.

364,737. Ester Condensation Products. Imperial Chemical Industries, Ltd., Millbank, London, W. Baird and R. Hill, Crumpsall Vale Chemical Works, Blackley, Manchester.

A polycarboxylic acid is treated with an excess of polyhydric alcohol, with or without catalysts, and the product heated with a fatty oil till the mixture is homogeneous. This product is treated with a polycarboxylic acid, with or without mono-carboxylic acids to esterify the free alcoholic groups. Polyhydric alcohols employed include ethylene glycol, mannitol, glycerol and carboxylic acids or anhydrides employed include succinic acid, phthalic acid, citric acid or their anhydrides. A number of examples of these products are described.

365,076. Dehydrating Acetic Acid. Kodak, Ltd., Kingsway, London. From Eastman Kodak Co., Rochester, N.Y., U.S.A.

Acetic acid is treated with sulphur dioxide or trioxide and nitrogen peroxide or nitric acid, which form nitrosyl sulphuric acid in it. The acetic acid may be distilled off or may be used without separation for the acetylation of celullose. The sulphur dioxide may be developed in the solution from water-soluble sulphites or bisulphites, or from organic sulphites.

364,873. Chlorinated Meta-styrene. Imperial Chemical Industries, Ltd., Millbank, London.

Resinous products suitable as constituents of plastic and coating compositions are obtained by treating meta-styrene with chlorine in the dark at 0°-25° C. in the presence of iron and aluminium chloride, a chlorinated solvent such as carbon tetrachloride, tetrachlorethylene or tetrachlorethane, and water. The products having the highest chlorine content have the lowest viscosities and highest melting points. Starting materials of high molecular weight yield products suitable for spraying compositions.

Specifications Accepted with Date of Application

370,388. ψ-cyanines containing β-naphthaquinoline nuclei, Preparation of. Ilford, Ltd., and F. M. Hamer. December 24, 1930.

370,402. Alkyl ethers of amino-beta-hydroxy-anthraquinones, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie.*) Jan. 5, 1931

370,412. Fractional distillation. Chemical and Metallurgical Corporation, Ltd., J. W. Crabtree, S. B. Casson, and G. C. Riley. December 31, 1930.

370,414. Acetylene from hydrocarbons, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie.*) Dec. 31, 1930.

370,438. Acetic anhydride, Manufacture of. I. G. Farbenindustrie. January 6, 1931. Addition to 353,688.

370,466. Desulphurization of gases. J. Y. Johnson. (*I. G. Farbenindustrie*). Nov. 5, 1930.

370,457. Hydrogen of carbon monoxide-hydrogen mixtures or gases containing the same, Producion of. B. R. Goodfellow, W. D. Spencer and Imperial Chemical Industries, Ltd. Jan. 8, 1931.

370,458. Sulphurized phenols, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie*). Jan. 8, 1931.

370,459. Aromatic monoacyldiamines, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie*). Jan. 8, 1931.

370,490. Halogenated alcohols, Manufacture of. I. G. Farbenindustrie, and A. Carpmael. Jan. 7, 1931. Addition to 235,584.

370,606. Azo-dyestuffs, Manufacture of. W. W. Groves. (*I. G. Farbenindustrie*). Mar. 12, 1931.

370,693. Derivatives of the chlorine type of the carbamic acid series, Manufacture of. W. Merck, K. Merck, L. Merck, W. Merck, and F. Merck (trading as E. Merck (Firm of).) May 8, 1930.

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For Grinding DI-CALCIUM PHOSPHATE

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For Grinding RUBBER CHEMICALS

For Grinding IRON OXIDES

For Grinding LEAD PIGMENTS

For Grinding CHLORIDE OF LIME

For Grinding CALCINED BONES

For Separating MAGNESIA

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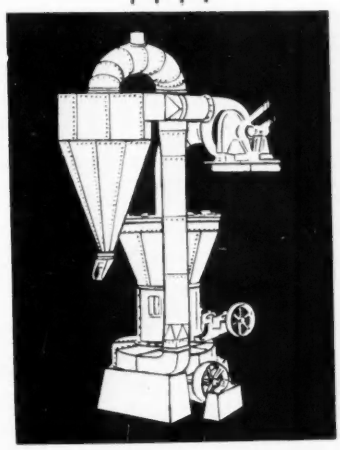

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11, Southampton Row, London, W.C.1.
Works: Derby & Erith.

Telephone:
Holborn 7277 (3 lines)

Telegrams and Cables:
Hardraymil Westcent London.

DUSTLESS GRINDING

370,705. Azo-dyestuffs containing sulphur, Manufacture of. Soc. Anon. des Matieres Colorantes et Produits Chimiques de Saint-Denis and R. Lantz. June 20, 1930.

370,706. Leaching phosphate rock, Method of Kunstdunger-Patent-Verwertungs. Apr. 27, 1931. Addition to 356,627.

370,716. Oxyethyl-amino-derivatives of the anthraquinone series, Manufacture of. Soc. of Chemical Industry in Basle. June 4, 1930.

370,724. Beta-amino-anthraquinone, Preparation of. Newport Chemical Corporation. June 13, 1930.

370,738. Ores containing lead, Treatment of. P. Gamichon. June 18, 1930.

370,771. Concentrating acetic and other acids, Processes of. Carbide and Carbon Chemicals Corporation. July 25, 1930.

370,774. Arylamines, Manufacture of. R. Haddan. (*Federal Phosphorus Co.*) July 16, 1931.

370,793. Coarse crystals of ammonium salts formed in an acid saturator, Process of and apparatus for obtaining. Collin & Co. Sept. 25, 1930.

370,820. Diacylated diamines, Manufacture of. Soc. of Chemical Industry in Basle. Sept. 27, 1930.

370,822. Preventing the formation of sulphuretted hydrogen in combustible gases during the removal of benzol therefrom, Process for. Carbo-Norit-Union Verwaltungs-Ges. Oct. 4, 1930.

370,823. Cyclic ketones, Manufacture of. Schering-Kahlbaum. Oct. 17, 1930.

370,834. Hydrogen, Manufacture of. Ateliers Generaux de Construction Soc. Anon. Jan. 16, 1931.

370,845. Esters of sulphonated aromatic carboxylic acids of the benzene series, Manufacture of. Soc. of Chemical Industry in Basle. Mar. 30, 1931. Addition to 0589/31.

Applications for Patents

[*In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.*]

Barlow, C. H., Imperial Chemical Industries, Ltd., and Lawrie, L. G. Fur dyeing. 11326. April 20.

Bindley Processes, Ltd., R., and Bindley, W. T. R. Catalysers. 11113. April 18.

Bloxam, A. G. (*Soc. of Chemical Industry in Basle*). Manufacture of vat-dyestuffs. 11200. April 19.

Boot's Pure Drug Co., Ltd., Pyman, F. L., Levene, H. H. L. Manufacture of derivatives of sterols. 11602. April 22.

Distillers Co., Ltd., Dymock, J. B., Joshua, W. P., and Stanley, H. M. Manufacture of ethyl alcohol. 11214. April 19.

Du Pont de Nemours & Co., E. I. Production of organic acids or esters. 11112. April 18. (United States, April 18, '31.)

Edeleanu Ges. Refining liquid hydrocarbons. 11101. April 18. (Germany, May 2, '31.)

—— Refining liquid hydrocarbons. 11102. April 18. (Germany, May 1, '31.)

Johnson, J. Y. (*I. G. Farbenindustrie.*) Manufacture of acetylene chlorides. 11610. April 22.

—— Catalytic purification of oxygen-containing hydrogenation products. 11611. April 22.

—— Manufacture of esters of higher fatty acids. 11743. April 23.

I. G. Farbenindustrie. Manufacture of acid dyestuffs of the anthraquinone series. 11091. April 18. (Germany, April 16, '31.)

—— Manufacture of indigoid vat dyestuffs. 11092. April 18. (Germany, April 16, '31.)

—— Manufacture of vat-dyestuffs of the pyranthrone series. 11093. April 18. (Germany, April 17, '31.)

Imperial Chemical Industries, Ltd. Insecticides. 11042. April 18.

—— and Shepherdson, A. Sulphonated oils. 11043, 11044. April 18.

—— and Lawrie, L. G. Delustring artificial silk. 11045. April 18.

—— Fur dyeing. 11326. April 20.

—— Artificial oil-soluble resinous compositions. 11714. April 23.

Metallges. Akt.-Ges. Concentrating rubber latex. 11409. April 21

—— Production of alkali phosphates. 11649. April 22. (Germany, Dec. 17, '31.)

New Jersey Zinc Co. Zinc sulphide. 11658. April 22. (United States, May 19, '31.)

Schering-Kahlbaum Akt.-Ges. Manufacture of condensation products from 2.6-diaminopyridine and its derivatives. 11388. April 20. (Germany, May 13, '31.)

Soc. of Chemical Industry in Basle. Manufacture of indigoid vat-dyestuffs. 11094. April 18. (Aug. 10, '31.)

—— Manufacture of resinous condensation products. 11401. April 21. (Switzerland, April 23, '31.)

Wetial. Production of ammonium sulphate. 11229. April 19. (France, April 20, '31.)

Points from Manufacturers' Literature

The Editor welcomes copies of new brochures and leaflets describing plant, equipment and products of interest to chemical manufacturers and the chemical using trades.

IN THE DRAYTON STEAM DE-SUPERHEATER, made by the Drayton Regulator and Instrument Co., Ltd., of West Drayton, Middlesex, regulation of the spray water is effected by movement of a metering cone in the nozzle head and not by the operation of a valve in the water supply, which latter causes variation of water pressure at the nozzle head, resulting in imperfect atomisation at light loads when only small quantities of water are required. The steam enters a relatively large diameter central tube at a greatly reduced velocity, meets the injection water, and passes over a series of baffle plates below the nozzle, which ensures intimate contact between the steam and water. The de-superheated steam then passes through a spiral separator between the central and the outer tube shell. Any trace of entrained water is thrown against the shell and finds its way to the bottom of the shell, whence it is removed by steam trap. The quantity of water is regulated to maintain a constant temperature at the outlet, regardless of load variations, by means of a Drayton temperature regulator which controls the metering cone of the nozzle.

* * *

A SPECIAL BASE MOUNTING FOR MOTORS, enabling constant belt or rope tension to be maintained without further attention or adjustment, is illustrated in a leaflet received from Crofts (Engineers), Ltd., of Thornbury, Bradford. This "Constension" drive is applicable to short flat belt, V-flat or V-rope drives, with powers up to 50 h.p. and ratios as much as 7 to 1. It offers to power users, in every industry, a maximum power transmission at low cost, uniform power and uniform speeds being consistently maintained without the use of intricate mechanism. This is done by mounting the motor on a located free-swinging pivoted base, where its own weight is utilised to maintain the correct tension throughout the life of the drive, and, as tension can be determined on site, only the necessary portion of the weight is brought into use. Where shaft centres are permanently altered adjusting screws in the base provide for necessary adjustment. Bases are standardised in adjustable types and for machine mounting for all standard makes of electric motors.

* * *

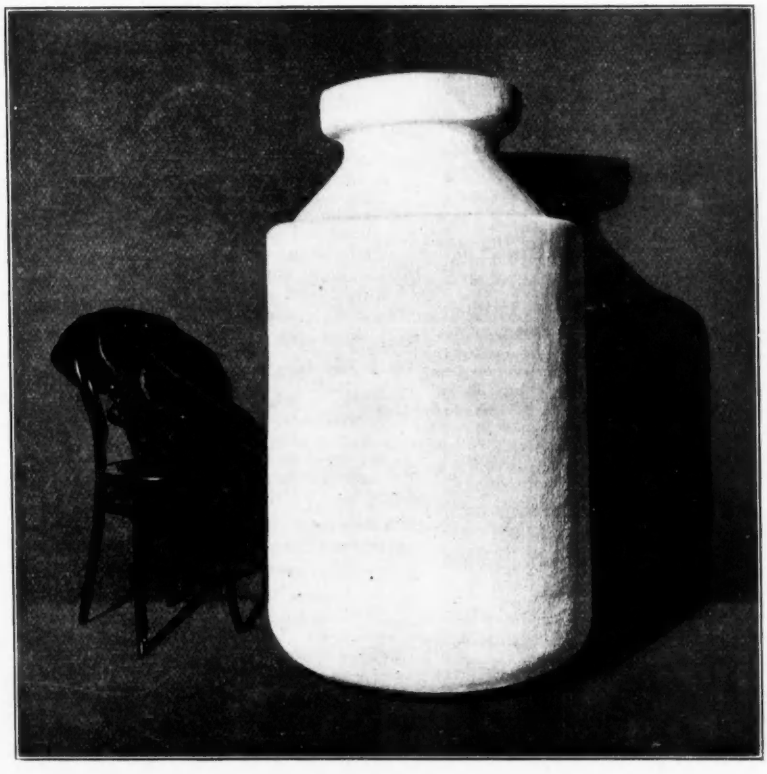
APPARATUS FOR THE RAPID ESTIMATION OF MOISTURE in seeds, cereals, flour, tea, wool and other materials is described in literature issued by A. Gallenkamp and Co., Ltd., of Technico House, 17-29 Sun Street, Finsbury, E.C.2. This moisture meter, designed by R. M. Davies, of the University College, Aberystwyth, is of British manufacture. Tests can be made in less than one minute and there are no complicated instructions to be followed in making a test; neither is there any need for accurate measurement of sample (by volume or weight). After preliminary adjustment of the battery voltage by moving the wander plugs until the galvanometer deflection is the same as its calibration value, the apparatus is ready for testing purposes. The test vessel is first filled with the sample to be examined, which is packed as tightly as possible by means of an ebonite plunger. The test vessel is then inserted in its stand provided on the apparatus, the switch is rotated and the galvanometer reading is taken. The percentage moisture-content of the sample is then found by reference to a calibration table.

Import Duties Advisory Committee

Applications for Addition to Free List

THE Import Duties Advisory Committee desire to announce that applications, whether in relation to additional duties or to the Free List, should be made, so far as possible, by representative bodies of the trades concerned. The Committee do not propose to proceed as a rule by formal hearings. Applicants, therefore, should submit their case fully in writing and the Committee will call for such supplementary statement, oral or written, as may be required. The Committee will from time to time give notice of cases in which they are considering the question of the imposition or modification of "additional" duties, or of variations of the Free List, in order that interested parties may have the opportunity of making representations.

VITREOSIL CONTAINERS



Improvements in manufacture have made possible the production of containers or reaction vessels of large size. The picture shows one of 108 gallons capacity. It is 4ft. 6in. in height overall, and 2ft. 6in. internal body diameter.

THE THERMAL SYNDICATE LTD.

VITREOSIL WORKS, WALLSEND-ON-TYNE

LONDON DEPOT : THERMAL HOUSE, OLD PYE STREET, S.W.1.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgment

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

DEODIS PRODUCTS, LTD., 22 Northumberland Avenue, London, W.C., chemical manufacturers. (C.C., 30/4/32.) £107 11s. 10d. February 16.

Receivership

BOSCO, SMITH AND DAVIS, LTD. (formerly Dry Colour Supplies, Ltd.). (R., 30/4/32.) D. W. Berry, of 306 Hoe Street, Walthamstow, was appointed receiver and manager on April 12, 1932, under powers contained in debenture dated June 11, 1931.

Company Winding Up Voluntarily

UNION ACID CO., LTD. (C.W.U.V., 30/4/32.) By special resolution, March 31. Mr. A. S. Chamberlain appointed liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

FILTRATORS, LTD., London, W.C. (M., 30/4/32.) Registered April 15, £2,000 debentures (ranking in priority to B. debentures), to Branch Nominees, Ltd., 15 Bishopsgate, E.C.; general charge. *£1,681. December 28, 1931.

LOWER LANSALSON AND CAUDLEDOWN CHINA CLAY CO., LTD., Stoke-on-Trent. (M., 30/4/32.) Registered April 15, £1,500 debentures, part of £65,000; general charge. *£52,500. May 5, 1931.

SILVER SPRINGS BLEACHING AND DYEING CO., LTD., Congleton. (M., 30/4/32.) Registered April 18, £8,000 debentures, to Union Bank of Manchester, Ltd.; general charge. *£22,678. September 22, 1930.

ZINC MANUFACTURING CO., LTD., London, E.C. (M., 30/4/32.) Registered April 18, £15,000 charge, to Stewarts and Lloyds, Ltd., 41 Oswald Street, Glasgow; charged on land and buildings at Kingsnorth, Hoo (Kent). *——. December 7, 1931.

Satisfactions

BONNAIRE, LTD., London, W., chemical manufacturers. (M.S., 30/4/32.) Satisfaction registered April 14, £800, registered July 17, 1931.

LOWER LANSALSON AND CAUDLEDOWN CHINA CLAY CO., LTD. (M.S., 30/4/32.) Satisfaction registered April 20, £500, part of amount registered October 4, 1921.

New Companies Registered

CALLINGTON ZINC OXIDE CO., LTD. Registered April 20. Capital £3,000 in £1 shares (2,000 ordinary "A" and 1,000 ordinary "B"). To carry on business as smelters of zinc spelter, manufacturers of zinc oxide and to take an assignment from the Western Oxide and Paint Co., Ltd., of certain leasehold premises known as South View, Callington, and comprised in a lease dated September 23, 1931. The provisional directors are:—A. H. Blight, Callington, Cornwall; G. T. Phillips. Solicitors: Adams and Croft, 13 Princess Square, Plymouth.

CELLULOID PRODUCTS, LTD., Spencer House, 4 South Place, London, E.C.2. Registered April 23. Nominal capital £1,500 in 24,000 ordinary and 6,000 founders' shares of 1s. each. Film cleaners, chemical or celluloid manufacturers, factors, dealers and agents, etc. Directors: Capt. F. J. T. Moon, F. C. Rawson, S. H. Rawson.

LUMINOUS PRODUCTS MANUFACTURING CO., LTD. Registered April 23. Nominal capital £2,000 in £1 shares. Manufacturers of and dealers in luminous paints and products. Directors: F. W. V. FitzGerald, 32 Highbury Hill, London, N.5; L. E. Bowden.

MANCHESTER TARRED SLAG CO., LTD. Registered April 21. Nominal capital £2,000 in £1 shares. Manufacturers of and dealers in tarred slag, asphalt, bitumen, tar, macadam, mortar, ballast and building and road-making materials, quarry owners, coal and tar distillers, etc. Directors: G. Vickers, The Poplars, Kilburn, near Derby; W. Sandwith, L. G. Clugston, J. G. T. Eccles.

W. E. WILLIS AND CO., LTD., 48 Mark Lane, London, E.C.3. Registered April 21. Nominal capital £1,000 in £1 shares. Dealers in cutch and tanning materials, chemists, druggists, drysalters, oil and colourmen, etc.

New Chemical Trade Mark

Compiled from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London W.C.2.

Opposition to the Registration of the following Trade Mark can be lodged up to May 20, 1932.

Lecivit. 529,351. Class 4.—Lecithin extracts being raw or partly prepared vegetable substances for use in manufactures. Lehmann and Voss and Co. Mit Beschrankter Haftung (a company incorporated under the laws of Germany), Bieberhaus, Hamburg 1, Germany. February 11, 1932. (Date claimed under the International Convention, August 13, 1931.)

Chemical Trade Inquiries

Abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

CANADA.—An import merchant and manufacturers' agent at Vancouver is prepared to represent United Kingdom manufacturers of malt extract in Western Canada, presumably on a commission basis. (Ref. No. 745.)

CANADA.—A firm of importers and exporters in Montreal desire to undertake United Kingdom agencies for the sale of chemicals, either as brokers or according to mutual agreement. (Ref. No. 747.)

NEW ZEALAND.—H.M. Trade Commissioner in New Zealand reports that the New Zealand Government Stores Control Board are calling for tenders, to be presented in Wellington by June 10, 1932, for the supply of disinfectant fluid for the period of one or two years from August 1, 1932. (Ref. No. F.X. 1467.)

EGYPT.—A firm of importers, established at Cairo and Alexandria, desire to obtain the representation of United Kingdom manufacturers of chemicals, drugs and specialities for the pharmaceutical trade, petroleum jelly and industrial chemicals. (Ref. No. 769.)

EGYPT.—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Government Assay Office is calling for tenders, to be presented in Cairo by June 15, 1932, for the supply of chemicals, etc., required for assay purposes. (Ref. No. F.X. 1465.)

Tariff Changes

QUEENSLAND.—The Queensland *Government Gazette* contains regulations prescribing the standards to which lysol must conform in order to be sold in Queensland. Particulars of these standards may be obtained from the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1.

PALESTINE.—An order, effective from April 16, prohibits the import into Palestine of methylated spirits other than mineralised methylated spirits. Definitions of mineralised methylated spirits are contained in regulations published in the *Official Gazette*, which may be seen by persons interested at the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1.